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# BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense.

UNDER THE DIRECTION OF

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

J. R. SCHRAMM, Editor-in-Chief

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Vol. 13

AUGUST, 1924

No. 8

ENTRIES 5616-6338

## AGRONOMY

C. V. PIPER, *Editor*

MARY R. BURR, *Assistant Editor*

(See also in this issue Entries 5738, 6116, 6262, 6304, 6308)

5616. ANONYMOUS. A classification and detailed description of the more important wheats of Australia. *Inst. Sci. and Indust. Australia Bull.* 26. 72 p., 5 pl. (1 col.). 1923.—This is a revision and extension of bulletin 18 [see Bot. Absts. 12, Entry 1532]. Eighty-two varieties are described on the basis of botanical and agricultural characters. Comparative data are presented relative to agricultural characters of a large number of varieties grown in Queensland, New South Wales, and in southern and western Australia.—*L. R. Waldron.*

5617. ANONYMOUS. Notes on some of the Union's industrial possibilities. III. The more efficient utilization of maize. *South African Jour. Indust.* 6: 605-608. 1923.—The numerous by-products of maize are discussed. The Union of South Africa has become known in the markets of the world as one of the foremost fields for the production of maize of good quality. It would be possible in South Africa to build up an industry in maize products close to the source, and to manufacture these products at a low cost owing to the presence of cheap yet efficient unskilled labor.—*L. J. Goldblatt.*

5618. BARNES, WILL C. The problem of systems of grazing. *Jour. Amer. Soc. Agron.* 16: 202-205. 1924.—The speaker in this address states that lack of system in handling stock grazing on the ranges is one of the most serious causes of range deterioration, which may be divided into two general causes—too early grazing and lack of proper distribution.—*F. M. Schertz.*

5619. BEETS, A. N. J. Bemestingsproeven 1917-1918. [Manure experiments in 1917-1918.] *Mededeel. Proefsta. Vorstenland. Tabak* 41: 1-64. 1919.—Analyses of *desa*-manure (native compost) are given. This compost is collected in the villages and spread on the tobacco fields or in the furrows before planting to the amount of 16-32 cm. to a *bouw* (1.755 acres). Since manuring with *desa* spreads the disease caused by *Phytophthora nicotianae*, tests were made to see if it could be replaced by the use of ammonium sulphate and hyperphosphate separately and in various combinations and proportions. It was concluded from these experiments that *desa* is essential for best results in yield, length of leaf, and quality, and could not be replaced by chemicals. In certain districts it might be possible to replace *desa* by 6 gr. per plant of ammonium sulphate for not more than one planting without unduly influencing the length of the leaf. In certain very special fields ammonium sulphate may have a favorable

influence on length of leaf and quality. In one field experiment, benefit to yield was shown by adding a mixture of ammonium sulphate and hyperphosphate to the *dessa*. No definite conclusions were drawn as to the influence of the hyperphosphate.—*L. S. and W. H. Weston.*

5620. BELL, A. BORRADAILE. **Statistics of crops grown by Europeans in Southern Rhodesia. For the Season 1922-23.** Rhodesia Agric. Jour. 21: 32-39. 1924. This is a complete statistical statement of all crops grown in southern Rhodesia during the last season. Tables given show: Districts in order of average cultivated land; cultivated crops in order of area; and acreage in relation to class of crop. Maize is still the main crop of Rhodesia for although there is an increase in both acreage and yield of such crops as ground nuts, sunflowers and velvet beans, maize has increased in a greater ratio as is evidenced by the fact that 82.9% of the total cultivated area was planted to maize as against 79.7% in 1921-22.—Tobacco shows a decreased acreage in Virginian (nearly 16% on 1921-22) but a small increase in Turkish. The acreage under velvet beans has been more than doubled.—Cotton was grown during the season only on a small experimental scale, the total being 21 acres and the yield 2862 pounds. The total number of citrus trees is 201,383 and of these, 148,471 are shown as irrigated. The actual number of bona-fide citrus growers is small though they own probably  $\frac{3}{4}$  of the total trees.—*L. J. Goldblatt.*

5621. BENTON, ALVA H. **Dockage in wheat in North Dakota.** North Dakota Agric. Exp. Sta. Bull. 172. 1-15. 7 fig. 1924.—A detailed study of dockage in wheat made in Foster County showed 10% weed seeds present. Over the state as a whole (1923) dockage amounted to 11.3%. From 5 elevators from Foster County the 242 cars shipped gave but 3.3% dockage after cleaning. In 1923 the amount of loss accruing to farmers because of the presence of weed seeds amounted to over \$6,000,000, in addition to the indirect loss of a lessened yield and a frequent reduction in grade. It is pointed out that with modern cleaning machinery the percentage of dockage can be reduced materially at time of threshing.—*L. R. Waldron.*

5622. BRENCHLEY, WINIFRED ELSIE. **Manuring of grass land for hay.** 146 p., 6 diagr. Longmans, Green and Co.: London, 1924.—This book presents the results of the manurial experiments on grass land on heavy clay soils carried on continuously at Rothamsted since 1856. The 1st crop of grass has been cut for hay every year, but until 1872 the aftermath was usually fed off with sheep penned in each plot. On several plots the animals suffered, and as the use of sheep introduced other factors than those associated with artificial fertilizers, this method was discontinued and the 2nd crop cut, made into hay whenever weather permitted or else carted away green and the equivalent quantity of hay calculated. 1. The results are presented for each plot showing yields, notes on general characters, a list of the principal species comprising the mixture, number of species and personnel of species; special notes are given as to the effect of liming, as in most cases there are both limed and unlimed plots. 2. The data are presented for each important plant species, showing its reaction to each of the treatments. A summary of the broader conclusions to be drawn from the experiments is appended.—*C. V. Piper.*

5623. BROWN, H. D. **Report on the fertilizing value of activated sludge.** Div. Sanitary Engineering, Provincial Board of Health, Ontario, Canada Ann. Rept. 1921 (Bull. 10): 115-126. 1921.—The previously reported work (39th Ann. Rept. Provincial Board of Health, Ontario, Canada, 1920) was continued with substantial agreement. The comparative yields of tobacco from 40 pounds N per acre applied in various forms of fertilizers were: Activated sludge, 100; dried blood, 87.5; cyanamid, 65;  $\text{NaNO}_3$ , 42.5; tankage, 32.5;  $(\text{NH}_4)_2\text{SO}_4$ , 22.5. Crop yields increased with increased applications of sludge up to 40 pounds N per acre and gradually decreased with heavier applications. Data on the cost of N in the various forms of commercial fertilizers is given and it is stated that on this basis activated sludge might be valued at approximately \$30 per 100 pounds of N—\$30 per ton of dried sludge (5%N).—*Rudolph E. Thompson.*

5624. BUTCHER, F. H. **A note on potatoes and their cultivation in South India.** Jour. Madras Agric. Students Union 11: 281-285. 1923.—According to Roxburgh, the potato was in cultivation in India toward the close of the 18th century though it might have been introduced much earlier. Authentic records show that it was grown in the Nilgiris in 1824.—The method of cultivating this crop and storing it for seed purposes is described.—*P. S. Jivanna Rao.*



5625. CAMPBELL, E. G. Weed value. Jour. Amer. Soc. Agron. 16: 91-96. 1924.—The paper shows the value of weeds to the farmer.—*F. M. Schertz.*

5626. CARRIER, LYMAN. The problem of tame grass pastures in the humid North. Jour. Amer. Soc. Agron. 16: 192-196. 1924.—In this address the speaker calls attention to the fact that pasturage is the only large supply of cheap feed in the U. S. A., and that half the feed consumed by livestock there is secured from pastures. Any method of general application which increases the returns from pastures by even a few pounds of meat, wool or milk per acre adds a large sum to the agricultural wealth of the country. The problems of seeding, fertilizing and rate of grazing are briefly discussed.—*F. M. Schertz.*

5627. CHEVALIER, AUG. Sur quelques vesces francaises fourragères. [Some French vetches used for forage.] Rev. Bot. Appl. et Agric. Coloniale 2: 354-357. 1922.—Brief notes are given on a number of vetches used in France as forage. These are *Vicia sativa*, *V. narbonensis*, *V. villosa*, *V. godroni*, *V. atropurpurea*, *V. perennis*, *V. macrocarpa*, and *V. cracca*.—*Paul Russell.*

5628. CONRAD, JOHN P. A suggested system for harvesting hay in a chopped condition. Jour. Amer. Soc. Agron. 16: 48-51. 1924.—A combined reaper-ensilage-cutter is recommended; the hay is stored in a damp condition.—*F. M. Schertz.*

5629. COX, J. F. Problems of alfalfa in the East. Jour. Amer. Soc. Agron. 16: 164-169. 1924.—This is an address in which the speaker points out the shift in alfalfa production—decreasing in western alfalfa growing states of the U. S. A., and increasing phenomenally in the "Corn belt" (Great Lakes, New England and Eastern States). The increase in alfalfa acreage in the Eastern States over a 4 year period (1919-1923) was approximately 50 per cent. The matter of seed, liming, varietal adaptability, inoculation, insect pests and diseases, cutting for hay, use for pasturage and the economics of the alfalfa crop are briefly touched upon.—*F. M. Schertz.*

5630. ETHERIDGE, W. C., J. O. MORGAN, M. J. FUNCHESS, M. L. FISCHER, E. G. SCHAFER, T. K. WOLFE, J. W. ZAHNLEY, A. C. ARNY, AND H. P. COOPER. Report of the committee for the improvement of laboratory work in the introductory course in field crops. Jour. Amer. Soc. Agron. 16: 17-23. 1924.

5631. FAIN, JOHN R. The problems of pastures in the semi-waste lands of the Southern Coastal Plains. Jour. Amer. Soc. Agron. 16: 207-213. 1924.—This is an address in which the utilization of native plants, adaptation of better plants, fungous diseases, climatic conditions, soil conditions and seed supply in their relations to the problems of pastures in the semi-waste lands of the Southern Coastal Plains, U. S. A., are discussed.—*F. M. Schertz.*

5632. GABRIEL, CYPRIEN. La culture du tabac en Corse. [Tobacco culture in Corsica.] Rev. Bot. Appl. et Agric. Coloniale 2: 351-354. 1922.—The culture, preparation for market, and yield of tobacco in Corsica are considered.—*Paul Russell.*

5633. GRABER, L. F. The growth of alfalfa with various cutting treatments. Jour. Amer. Soc. Agron. 16: 169-172. 1924.—This is an address in which the speaker calls attention to the fact that the response of alfalfa to various cutting treatments is far more pronounced than was formerly appreciated, yields being not only vitally influenced but the longevity of the plants and their vigor and hardiness greatly affected by the frequency of cutting at various periods of growth. Experiments are cited in substantiation of this theory.—*F. M. Schertz.*

5634. GUSTAFSON, A. F. Fertilizing timothy and calculating financial returns. Jour. Amer. Soc. Agron. 16: 155-164. 1924.—This is an address giving a brief résumé of the results of long time experiments on fertilizing timothy.—*F. M. Schertz.*

5635. HACKLEMAN, J. C. The future of the soybean as a forage crop. Jour. Amer. Soc. Agron. 16: 228-236. 1924.—This paper discusses the possibilities and probable future of the soybean and its products in corn belt agriculture. From a close study of the crop, its utilization and its phenomenal increase since 1918, the following conclusions are drawn by the author: (1) That the acreage of soybeans will and should increase; (2) that the most profitable outlet for production will be as a seed crop and as a home-grown nitrogenous feed substituted for the high-priced commercial concentrates; (3) that applications of limestone to the soil must be recognized as essential to the most successful permanent production of soybeans; (4) that after sweetening the soil, more efficient methods of inoculation must be found; and (5)



that the legumes must be classified more nearly on the basis of their special or particular values. The soybean is classified as the best annual nitrogenous seed and hay-producing plant.—*W. J. Morse.*

5636. HALBERT, H. R. Tobacco seed beds. Jour. Dept. Agric. Union South Africa 8: 51-55. 1924.—Success in producing a good crop of tobacco depends to a large extent upon having a good supply of young plants at the most favorable time for transplanting. The article tells how this may best be done.—*L. J. Goldblatt.*

5637. HALL, THOS. D. White versus yellow maize as a pig and poultry food. Jour. Dept. Agric. Union South Africa 7: 352-363. 2 fig. 1923.—Feeding experiments with yellow and white maize on poultry and pigs, prove the yellow maize a better feed due to the presence of vitamin fat-soluble A. When however the deficiency of this vitamin in white maize is supplemented by the addition of green lucerne, etc., both appear to have the same feeding value. The absence of vitamin A causes weak sickly birds among poultry.—*L. J. Goldblatt.*

5638. HASKELL, S. B. The problem of pastures in semi-waste lands of New England. Jour. Amer. Soc. Agron. 16: 205-206. 1924.—In this address, it is stated that a glacial drift soil, topography, climate, history and the industrial situation are all elements which have entered into the decline of the permanent pastures of New England. The speaker suggests that the 2 great problems demanding solution are maintenance of fertility and control of weed growth.—*F. M. Schertz.*

5639. JARDINE, JAMES T. The problem of improving western ranges. Jour. Amer. Soc. Agron. 16: 196-202. 1924.—In this address the speaker touches upon the character and condition of lands, main causes of range deterioration, direct and indirect, and suggests certain improvements which will help in the solution of the range problem in all the western range territory.—*F. M. Schertz.*

5640. JENSEN, HJ. Een en ander over tabaksbibit. [Observations concerning tobacco seedlings.] Mededeel. Proefsta. Vorstenland. Tabak 33: 41-55. Pl. 3. 1918.—This is a general discussion of the preparation of the seed bed; the planting, watering, thinning, and shading of the seed plants; and their final transplantation into the field. By careful spacing, 1000-1500 per bed, by sensible manuring and watering, and by plenty of sunlight, plants as strong as possible should be secured. It is advised to give the plants full sunlight in the seed beds from the first, and to use the "pajongs" only against the heavy rains. It is advised to abandon the practice of shading the plants with "schaduwbladeren," as no benefit results and the practice, in addition to being expensive in time and money, offers a gratefully cool and shaded feeding ground for insects.—*L. S. and W. H. Weston.*

5641. JIVANNA RAO, P. S. Some common fodder grasses of South India. Jour. Madras Agric. Students Union 11: 77-81. 1923.—Names of some common grasses are given with notes on their vernacular names and fodder value. A few weeds are included.—*Author.*

5642. KASINATHA AIYAR, S. The ripening of the sugarcane. Jour. Madras Agric. Students Union 11: 287-292. 1923.—The author presents a new method of determining the ripeness of a cane, which is independent of variety, soil, climatic conditions, etc. When the ratio of the brix of the top and bottom halves of a cane is unity or very near unity the cane may be taken as ripe.—*P. S. Jivanna Rao.*

5643. KERLE, W. D., AND MARK H. REYNOLDS. Farmers' experiment plots. Wheat, oat and barley experiments, 1923. Agric. Gaz. New South Wales 35: 153-164. 3 fig. 1924.—In the central western district, experiments were carried out on 10 private farms, with 23 varieties of wheat. Hard Federation yielded well but was exceeded by other varieties at certain points. Yields of above 25 bushels were secured from Hard Federation and Union. In the northwestern district, experiments were carried on cooperatively upon 11 private farms. Out of 17 varieties tested, the highest yield, 42.5 bushels, was secured from the variety Wandilla. Detailed notes are given on the character of soil and methods of cultivation in the different experiments.—*L. R. Waldron.*

5644. KOCH, PIETER. Cotton culture. Jour. Dept. Agric. Union. South Africa 8: 39-50. 2 pl., 4 fig. 1924.—The cultivation of the cotton plant and the prospects of the industry are fully discussed. Cotton is a profitable crop to grow in South Africa and pays better than maize. The amount of cotton produced at present in South Africa, though not very large, is most encouraging. The prospects of the industry are good as prices tend to remain high and even to rise still higher.—*L. J. Goldblatt.*



5645. KOCH, PIETER. *Nicotiana rustica* as a possible source of tobacco extract. Agric. Jour. Union of South Africa 7: 416-419. 3 fig. 1923.—The description and history of *Nicotiana rustica* in this country are given. This tobacco is the "Bauer" tobacco of Hungary, and the "Latakia" of Northern Palestine. It is an exceptionally "strong" smoking tobacco with high nicotine content, analyses of samples showing it to be over 7% and as high as 12% nicotine. Experiments are being carried out to ascertain whether it may become a source of commercial nicotine.—L. J. Goldblatt.

5646. KRISHNAMURTHI RAO, K., AND G. GANAPATHI AIYAR. Jaggery—raw sugar—or gul. Jour. Madras Agric. Students Union 11: 266-378. 1923.—Gul or jaggery is obtained by boiling down the sugarcane juice in open pans over a direct fire. Its consumption is about 2½ million tons or about 5 times that of imported sugar. It is difficult to replace it entirely by white sugar as it is cheap and liked by Indians for its fine flavor. Color depends on several factors. Open boiling of the juice over a fire involves the production of colored substances and glucose in considerable quantities in the finished product. The keeping quality of gul is found to be closely related to its glucose and chlorine contents. The authors point out that liming the cane juice to slight acidity, shortening the time of boiling, limiting the temperature of the syrup to about 120°C. and slow stirring after the addition of a small quantity of powdered sugar, effect considerable improvement in the quality of the product.—P. S. Jivanna Rao.

5647. LANSDALL, K. A. Weeds of South Africa XI. Weed No. 6, the imbricate Cactus (*Opuntia Imbricata*, Harv). Order Cactaceae. Agric. Jour. Union South Africa 7: 407-410. 3 pl. 1923.—A description of this noxious weed is given. The method of eradication is to burn all parts of the plant.—L. J. Goldblatt.

5648. LANSDALL, K. A. Weeds of South Africa XII. Weed No. 7, cockle bur and burweed (*Xanthium* spp). Order Compositae. Jour. Dept. Agric. Union South Africa 8: 22-32. 7 pl. 1924.—Description and means of eradication are given.—L. J. Goldblatt.

5649. LEACH, CHAS. F. Legumes for acid soils. Jour. Amer. Soc. Agron. 16: 173-178. 1924.—In this address the speaker gives his experience in growing legumes on acid soil in the southern Coastal Plains Region, U. S. A.—F. M. Schertz.

5650. LEEUWE, H. Het afdekken van tabakszaadbedden met dhook-pajons en centralisatie van de zaadbedden-complexen. [The roofing of tobacco seed-beds with dhook-pajons, and the centralization of seed-bed groups.] Mededeel. Proefsta. Vorstenland. Tabak 44. 23-31. 1921.—The 1st part of the paper is a discussion of the results of experiments using lattices made of native "dhook" instead of the customary "rappah." The relative merit of such shelters with regard to ease of construction, duration, cost and appearance is discussed, as well as their value as sunshelters and during strong winds and showers.—The 2nd part considers the advantages of centralizing the seed bed groups from the point of view of: water supply; coolie labor; combating ants; overseeing the preparation of seed beds; irrigating, spraying, and manuring them; combating the "lanas" disease (*Phytophthora nicotianae*); and using machinery.—L. S. and W. H. Weston.

5651. LEIGHTY, C. E. The better utilization of straws. Jour. Amer. Soc. Agron. 16: 213-224. 1924.—The various uses of straw are discussed in this address, viz., its feed and manurial value, its use in manufacture and as a mulch, and the chemical treatment known as "processing."—F. M. Schertz.

5652. LEITH, B. D. Fluctuating variations in the soy bean. Jour. Amer. Soc. Agron. 16: 104-108. 1924.—Oil, protein content and the iodine number have fluctuated widely from year to year.—F. M. Schertz.

5653. LOVE, H. H. A modification of Students' table for use in interpreting experimental results. Jour. Amer. Soc. Agron. 16: 68-73. 1924.

5654. LOVE, H. H., AND A. M. BRUNSON. Students' method for interpreting paired experiments. Jour. Amer. Soc. Agron. 16: 60-68. 1924.—For observations which naturally arrange themselves in pairs, Students' method is a better method with which to determine the probability of the difference and deserves a larger application in the interpretation of agronomic investigations.—F. M. Schertz.

5655. [MCCALLAN, E. A.] Triumph seed potatoes. Agric. Bull. Bermuda Dept. Agric. 212: 3-5. 1923.—A report on the 1923 crop grown from seed imported from the U. S. A. and Canada, indicates a marked increase in mosaic and leaf roll in Bermuda over that shown in the seed stock which had been grown on Long Island.—H. H. Whetzel.



5656. MOOERS, C. A. **The problem of forage crops in relation to soil improvement.** Jour. Amer. Soc. Agron. 16: 236-238. 1924.—In this address the speaker brings out the value of legumes as soil improvers, the influence of non-legumes that follow them and crop rotations suitable to land that suffers from erosion.—*Mary R. Burr.*

5657. MUNDY, H. G. **Bulawayo Experiment Station. Annual report for season 1922-3.** Rhodesia Agric. Jour. 21: 52-57. 1924.—Experiments are devoted to crop investigations having for their object the determination of the most suitable crops and crop combinations for Matabeleland. The experiments are chiefly rotation experiments with maize, maize variety trials, forage crops for hay or fodder, legumes for grain, miscellaneous grain crops, and silage and succulent crops. The early yellow dents and yellow flints showed no superiority over the standard white dent maize varieties of the country. The white flowering type of linseed may be regarded as the heaviest seed yielder under local conditions. Two varieties of kafir made good growth and were entirely free from diseases and pests, though the best grain return from this crop was equal only to the 3rd poorest maize yield. In connection with silage and succulent crop experiments it was found that an excellent yield of both tops and tubers was obtained from sweet potatoes left in the ground for 2 seasons, while a large weight of green fodder was given by sunflowers, relatively light yields being obtained from both kafir and N'youti. Sunflower silage has proved inferior to that obtained from maize.—*L. J. Goldblatt.*

5658. OAKLEY, R. A. **Some silage problems.** Jour. Amer. Soc. Agron. 16: 186-192. 1924.—In this address the speaker discusses the economic value and the broad problems relating to silage and the use of the silo.—*F. M. Schertz.*

5659. OOSTHUIZEN, J. DU P. **Fertilizers and crop rotations.** Jour. Dept. Agric. Union South Africa 8: 57-71. 14 fig. 1924.—Fertilizer and crop rotation experiments and their effects on yields of seed cotton are fully discussed. The results of these experiments indicate that whenever kraal manure is available it is one of the best to use for cotton and, if the soil is acid, an addition of lime will still further increase the yield.—*L. J. Goldblatt.*

5660. PIPER, C. V. **The larger aspects of our forage supply.** Jour. Amer. Soc. Agron. 16: 153-155. 1924.—This is an address giving comments on a series of charts.—*F. M. Schertz.*

5661. PIPER, C. V. **The possibilities in new forage plants.** Jour. Amer. Soc. Agron. 16: 224-228. 1924.—This is an address in which the past achievements of some well-known introduced forage crops are set forth and some more recent introductions discussed.—*F. M. Schertz.*

5662. RAYBAUD, L. **Sur le buttage du Mais. [The banking up of corn.]** Compt. Rend. Soc. Biol. 88: 806-807. 1923.—Corn produces the best crop if earth is thrown up twice, at an interval of 2 weeks, against the base of the stems just before the tassels appear. Corn will not stand up before the "mistral" unless there have been 2 such treatments using moist soil and firm packing.—*Oran Raber.*

5663. RICHEY, FREDERICK D. **Adjusting yields to their regression on a moving average, as a means of correcting for soil heterogeneity.** Jour. Agric. Res. 27: 79-90. 2 fig. 1924.—In an experiment with corn, a planting arrangement was devised in which each of the strains to be compared was used successively as a check in 1 series of the 10 replicated plantings. Using the data obtained the significance of the probable error and the coefficients of correlation and regression in interpreting field plot experiments are considered. A method of adjusting yields to correct for soil heterogeneity is developed and presented, which utilizes the regression of the yields of the individual rows on the moving average yields of several rows as the basis of adjustment. As different varieties or strains are grown in successive rows, regression is determined from percentage yields in terms of the mean yields of a like number of rows of the same strain or strains.—*C. E. Leighty.*

5664. RIJKEN, G. J. **Eene nieuwe uitdunningsmethode van Tabakszaadbedden. [A new thinning-out method for tobacco seed beds.]** Mededeel. Proefsta. Vorstenland. Tabak 33. 37. 2 pl. 1918.—The following method has been devised to overcome the lack of judgment shown by the coolie in thinning out. The bed is divided lengthwise by strings into 10 equal divisions and across, into 4. In each of these 40 plots the coolie is instructed to leave 25 plants—a number small enough so that he can easily leave these remaining plants equally distributed. 40 × 25 plants makes 1000 in a bed; and 30 beds is the correct number for planting 1 bouw (1.755 acres). This method of counting insures a sufficient number of seedlings of a



better grade because of more accurate spacing, and allows the coolie's count to be checked up. The strings should not be set out until after the 5th day, as they will be rotted by the continual watering during the first 5 days.—*L. S. and W. H. Weston.*

5665. SCHOTH, H. A. **Comparative values of sunflower silages made from plants cut at different stages of maturity, and the effect of salt on the palatability of the silage.** Jour. Amer. Soc. Agron. 15: 438-442. 1923.—In the experiments at Corvallis, Oregon, sunflowers were made into silage at all stages of maturity. The chemical composition of these silages made with and without the addition of salt and millrun (approximately equal parts bran and shorts) was determined for the plants cut at different stages of maturity. The palatability rating is as follows: Bud stage, 60; full bloom, 50; ray flower fallen, 75;  $\frac{3}{4}$  mature, 75; fully ripe, 75; in all cases where  $\frac{1}{4}$  pound of salt or more, or 20 pounds of millrun per 100 pounds of silage was added, the palatability was 100.—*F. M. Schertz.*

5666. SCHOTH, H. A. **Hungarian vetch in Oregon.** Oregon Agric. Exp. Sta. Circ. 46. 1-4. 1923.—This variety of vetch is described and its good qualities are stressed. It is a good seed-producer, hardy, resistant to aphids, and affords excellent bee pasture for a long period. Directions for sowing, harvesting, cleaning seed and inoculation are given.—*C. E. Owens.*

5667. SHEPHERD, A. N., AND J. M. PITT. **Farmers' experiment plots. Winter green fodder experiments, 1923.** Agric. Gaz. New South Wales 35: 173-181. 5 fig. 1924.—In the central north coast district cooperative experiments were carried out upon 24 private farms. The crops grown for green fodder consisted of several varieties of barley, wheat and oats, each crop grown alone and mixed with peas or vetches. Several yields were secured approximating 20 tons of green fodder per acre. Notes on yields from fertilized ground are also given.—*L. R. Waldron.*

5668. SIDENIUS, E. **Droogproeven in 1915 en 1916.** [Drying tests in 1915 and 1916.] Mededeel. Proefsta. Vorstenland. Tabak 34. 1-38. 5 fig. 1918.—Experiments were made on drying tobacco in test sheds and in the field drying sheds, where results were achieved which closely approximated those of the test shed experiments. Dampened and also thoroughly wetted, mature leaves from different parts of the plant were used in the tests, the results being the same. Quickly dried green leaves give a better color, a less combustible tobacco, and one better adapted to withstand piling pressure than more slowly dried leaves. Slow drying gives a stiffer and coarser leaf, more spotted and frequently darker in color. Experiments were made to determine the influence of rapid or slow drying at any given temperature and it was concluded that the temperature of the drying shed apparently plays a smaller part than was formerly supposed, provided that the course of the drying is continuous. Drying in the field drying sheds may be hurried by opening the shutters in dry and closing them in wet weather and by building fires to artificially heat the sheds. The bamboo wood customarily used for this purpose, however, should be abandoned, as it deposits too much soot on the tobacco leaves.—*L. S. and W. H. Weston.*

5669. SMITH, CHARLES W. **How cowpeas improve the orchard.** South African Fruit Grower 11: 31. 1924.—The article deals with the value of this leguminous crop as a soil improver. Cowpeas when not turned under as green manure may be cut for a highly nutritive hay or silage.—*L. J. Goldblatt.*

5670. STENT, SYDNEY M., AND H. A. MELLE. **Fodder and pasture grasses of South Africa, IV Natal grass, Pennisetum unisetum Benth.** Jour. Dept. Agric. Union South Africa 7: 433-437. 2 fig. 1923.—The description and botanical characters of this grass are given, and the agricultural value and methods of cultivation discussed. A native of Natal and Tropical Africa, it grows to a height of 3-12 feet, and though flowering profusely, does not mature seed in South Africa.—Natal grass ranks first as a meadow grass for South Africa, but though one of the best under cultivation as a pasture grass, it cannot be regarded as first class for hay. It is moderately palatable and if cured in a large stack and allowed to "sweat," stock will eat it greedily.—*L. J. Goldblatt.*

5671. STOA, T. E. **The early harvest of rusted Marquis wheat.** Jour. Amer. Soc. Agron. 16: 41-47. 1924.—The proper stage for harvesting rusted wheat appears to be the same as for a normal harvest.—*F. M. Schertz.*

5672. STROMAN, G. N., AND D. T. KILLOUGH. **The Texas Station plan of cooperative distribution of pedigreed cotton seed.** Jour. Amer. Soc. Agron. 16: 127-130. 1924.



5673. TAYLOR, H. W. **Cotton culture.** Rhodesia Agric. Jour. 20: 511-523. 2 fig. 1923.—The author discusses the economic position of this industry and deals fully with the cultural methods of growing cotton. The large decrease in production of cotton in the Southern States, U. S. A., is due to shortage of labor and ravages of the boll weevil.—*L. J. Goldblatt.*

5674. TAYLOR, H. W. **Tobacco culture.** The harvesting and curing of Virginia tobacco. Rhodesia Agric. Jour. 20: 663-673. 5 fig. 1923.—The critical operations of harvesting and curing Virginia tobacco are fully treated. Proper handling on the farms, and grading and preparation for market would be both educational and remunerative to the grower, and would greatly assist in establishing the tobacco industry on an economic basis.—*L. J. Goldblatt.*

5675. TIEMANN, O. P. **Physical characteristics of disease-free seed corn.** Jour. Amer. Soc. Agron. 16: 37-40. 1924.—Mature, firm seed ears of average size which show very bright color or luster, medium smooth indentation and fairly good depth of kernel should be selected, avoiding large, rough seed ears which have a dull color.—*F. M. Schertz.*

5676. TREGENNA, C. J. **The tobacco harvest.** Agric. Gaz. New South Wales 35: 210. 1924.—Suggestions are made relative to the care which should be taken of the tobacco crop during harvesting and curing.—*L. R. Waldron.*

5677. WALSTER, H. L. **Culling seed corn.** North Dakota Agric. Exp. Sta. Ext. Circ. 60. 1-16. 12 fig. 1924.—Methods are presented of selecting seed corn and handling the seed after harvesting. Data are given on varieties of corn grown in North Dakota relative to length of ears, height of ears on the stalk, height of stalk, and amount of dry matter. Suggestions are made for selecting seed for corn shows.—*L. R. Waldron.*

5678. WALTERS, J. A. T. **Annual report of experiments 1922-1923.** Agricultural Experiment Station, Salisbury. Rhodesia Agric. Jour. 20: 695-703. 6 fig. 1923.—The report discusses experiments with grasses and with other crops, chiefly maize, at Salisbury, Rhodesia. Maize experiments are dealt with under rotation, perfect vs. reduced stands, variety trials, and inheritance of characters.—*L. J. Goldblatt.*

5679. WALTERS, J. A. T. **Annual report of experiments 1922-1923 (concluded).** Agricultural Experiment Station, Salisbury. Rhodesia Agric. Jour. 21: 40-51. 2 fig. 1923.—This report includes experiments on grain and fodder production. The following crops have been tested for their grain yield. (1) Ground nuts which rank next to maize in importance in Southern Rhodesia, and are usually grown in conjunction with that crop. The yield is very low, probably owing to the practice of planting at wide distances. (2) Velvet beans. (3) Dolichos beans. (4) Cowpeas. The ravages of the stem maggot were diminished by planting trap crops earlier in the season. (5) Haricot beans. (6) Tepary beans. (7) Sunflower. (8) Niger oil, which can be used in cattle feeding as a substitute for linseed. (9) Wheat. The Great Scott variety proved itself rust resistant. (10) Buckwheat and other miscellaneous grains. Fodder experiments described are those with maize, maize with velvet beans, sunflowers with velvet beans, sweet potato vines, dolichos beans, Niger oil and Kudzu vine. In a discussion on hay and root crops it is stated that the most uniformly reliable and successful of a large range of root crops is the sweet potato.—*L. J. Goldblatt.*

5680. WENHOLZ, H. **Broom millet growing in New South Wales.** Agric. Gaz. New South Wales 35: 165-172. 3 fig. 1924.—Cultural practices are given for producing this crop in N. S. W., dealing with climatic and soil conditions, preparation of the soil, planting, after-cultivation, harvesting, hacking, and baling. Annual production of broom millet in N. S. W. since 1912 has varied from 8,600 to 15,200 hundredweight. The imports have been inconsiderable.—*L. R. Waldron.*

5681. WIANCKO, A. T., S. C. SALMON, A. C. ARNY, H. H. LOVE, AND C. A. MOOERS. **Report of committee on standardization of field experiments.** Jour. Amer. Soc. Agron. 16: 1-16. 1924.—A bibliography of 177 references is appended.—*F. M. Schertz.*

5682. WIGGANS, R. G. **Relative adaptability of home-grown and foreign-grown red clover seed.** Jour. Amer. Soc. Agron. 15: 500-507. 1923.—Home-grown seed produces better yields than foreign-grown seed, especially where winters are severe. Seed produced for several generations under climatic conditions as severe as where the seed are to be sown will probably give best results.—*F. M. Schertz.*

5683. WORRAL, LLOYD. **Selection work with Meade cotton.** Jour. Dept. Agric. Union South Africa 7: 411-415. 3 fig. 1923.—A description is given of Meade cotton. This is an



American upland, long staple cotton of very fine quality lint.—The *modus operandi* in selection work is discussed. In an experiment under adverse conditions in South Africa, Meade cotton proved very promising and a number of selections were made.—*L. J. Goldblatt.*

## BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

CARROLL W. DODGE, *Editor*CHARLES A. WEATHERBY, *Assistant Editor*

(See also in this issue Entries 5944, 6105)

5684. ANONYMOUS. List of the reports and leaflets published by the State Experimental Department for Plant Culture. *Tidsskr. Planteavl* 2: 208-218. 1924.—The list contains 172 titles of reports of investigations and 100 titles of leaflets published by the State Experimental Department for Plant Culture, Denmark.—*Albert A. Hansen.*

5685. ANONYMOUS. *Nouvelles.* [Notices.] *Rev. Bryologique* 51: 15. 1924.—Attention is called to the recent deaths of the bryologists Letacq, Orszesko and Pearson.—*A. W. Evans.*

5686. ANONYMOUS. Rangachariar, K Rai Bahadur. *Jour. Madras Agric. Students Union* 11: 454-456. 1923.—A brief account is given concerning this Indian botanist who retired from service on the 3rd September 1923 after completing his 55th year. He worked in various capacities as author, examiner and anthropologist and was president of the Botany section of the Indian Science Congress in 1917 and president of the Indian Botanical Society in 1922. He was Lecturer and Systematic Botanist at the Agricultural College and Research Institute, Coimbatore, at the time of retirement.—*P. S. Jivanna Rao.*

5687. AMBERG, EMIL. Theophrastus of Hohenheim, called Paracelsus. *Amer. Jour. Pharm.* 95: 840-848. 1923.—Reprint from *American Medicine*, N. Ser., 17: 145-151. 1922.

5688. BULLOCH, WILLIAM. The influence of Pasteur upon the development of bacteriology and the doctrine of infection and immunity. *Nature* 110: Suppl. vi-vii. 1922.

5689. BUSCALIONI, LUIGI. Frammenti di storia della botanica contemporanea italiana. [Notes on contemporary botanical history of Italy.] *Malpighia* 29: 459-467. 1923.—The author discusses the appointment of Prof. Pirotta to the Botanical Institute of the University of Rome.—*Edith K. Cash.*

5690. COCKAYNE, L. Thomas Frederic Cheeseman 1846-1923. *Trans. and Proc. New Zealand Inst.* 54: xvii-xix. *Portrait.* 1923.

5691. COSTANTIN, J. Louis Matruchot. *Bull. Trimest. Soc. Mycol. France* 38: 127-139. *Portrait.* 1922.—An account is given of the life and researches of the famous French botanist. A list of his scientific works is given, comprising 90 titles.—*D. S. Welch.*

5692. COULTER, M. C. Gaston Bonnier. *Bot. Gaz.* 76: 425-426. *Portrait.* 1923.—A sketch of the career of Bonnier, whose death occurred on December 30, 1922, is given.—*B. W. Wells.*

5693. DAVIS, J. J. Pier Andrea Saccardo. *Bot. Gaz.* 70: 156-157. 1920.—This is a notice of his death Feb 12, 1920, an account of his career and some of his principal publications, of which the most noteworthy were *Fungi Italici autographice delineati* (1500 colored figures) and the *Sylloge Fungorum omnium hucusque cognitorum* (22 volumes). He devised the system of classification of the Fungi now in use and was the most outstanding figure in mycology of his generation.—*Author.*

5694. DAVY DE VIRVILLE, AD. Gaston Bonnier. *Bull. Mayenne Sci.* 1922: 112-117. 1 pl., 1 portrait. 1923.

5695. DORLODOT, HENRI DE. Le Darwinisme au point de vue de l'orthodoxie catholique. I. L'Origine des especes. *Collection Louvanium* 2. [Darwinism from the point of view of orthodox catholic doctrine. I. The origin of species. *Louvain Collection* 2.] 193 p. Vromant & Cie: Bruxelles, 1921.

5696. GALLAND, P. Henri Algan. *Bull. Trimest. Société Forest. de Franche-Comté et des provinces de l'Est* 15: 129-132. 1923.—This is a bibliographic sketch of Henri Algan, one of the best known members of the Society, on the occasion of his funeral.—*J. Kiltredge, Jr.*



5697. GIDON, F. Sur la replantation du jardin botanique de Caen, en 1778, par Desmoueux suivant le système de Trianon et sur les polémiques botaniques de l'an IV à Caen. [Replanting of the botanical garden at Caen in 1778 by Desmoueux, following the Trianon system; and botanical polemics of the year IV at Caen.] Bull. Soc. Linn. Normandie VII, 4: 175-183. 1921 [1922].

5698. HARDEN, ARTHUR. Pasteur's early research in pure chemistry and fermentation. Nature 110: Suppl. xi-xii. 1922.

5699. HOUARD, C. Répertoire des herbiers et des collections de l'Institut botanique et de la Galerie botanique de Caen. [List of herbaria and collections of the Botanical Institute and the Botanical Gallery at Caen.] Bull. Soc. Linn. Normandie VII, 2: 85-110. 1919.—The following herbaria of considerable scientific interest are located at Caen: Lenormand, Lamaroux, Vieillard, Dumont d'Urville, de Brébisson, Chauvin, Corbière, Pelvet, Roberge, and Godey. There are also many classical series of exsiccata such as Mougeot and Nestler, Desmazières, Godron, Schaerer, Tuckerman, Stenhammer, Zetterstedt, and Areschoug.—*M. Denis*.

5700. HUSNOT, T. Comment je suis devenu botaniste et lithographe. [How I became botanist and lithographer.] Rev. Bryologique 51: 1-5. 1924.—T. Husnot, editor of the Revue Bryologique, gives here a short narrative of his life, laying especial emphasis on his student days and on the various journeys that he made while still a young man. In connection with the publication of his works he learned the essentials of printing and lithography and prepared with his own hands the blocks for the plates in his *Muscologia Gallica*, published in 1894.—*A. W. Evans*.

5701. LAGERSHAUSEN, ET AL. Nekrologe Deutscher Botaniker. [Necrologies of German botanists.] Bot. Archiv 3: 1-9. 1923.—Necrologies of Friedrich Gruner, August Schulz, Eduard Palla and Hugo Conwentz are given.—*William Seifriz*.

5702. LARSEN, H. C. Statens Försøgsvirksomhed i Plantekultur, dens Organisation og Administration. [The State Department of Experiments in Plant Culture, its organization and administration.] Tidsskr. Planteavl 30: 1-178. 1923.—This is an historical account of the origin and development of state research in agriculture issued in commemoration of the 25th anniversary of the founding of the State Board of Plant Culture. This history of governmental agricultural experiments dates back to the work of J. P. Nielsen, a school teacher of Örslev, who performed numerous experiments with cultivated plants, weeds and plant diseases. His results were of such great practical value that his advice was eagerly sought by farmers. He attracted the attention of the Royal Agricultural Society and eventually the state subsidized his work. This state subsidy marks the first governmental appropriation for experimental agriculture and was the forerunner of the liberal grants that support the comparatively extensive system of experimental work in agriculture today.—*Albert A. Hansen*.

5703. LING, A. R. Pasteur and the fermentation industries. Nature 110: Suppl. xii-xiv. 1922.

5704. MORICEAU, B. Le Centenaire de Peradeniya. [The Centenary at Peradeniya.] Rév. Bot. Appl. et Agric. Coloniale 2: 389-392. 1922.—The hundredth anniversary of the founding of the Botanic Garden at Peradeniya was celebrated in March, 1922. The writer gives a history of the garden and a general description as it now appears.—*Paul Russell*.

5705. RECORD, S. J. Woods used by the ancient Egyptians. Amer. Forest. 29: 479-484. 13 fig. 1923.—One of the most prized woods was the cedar (*Cedrus*), which was employed for coffins, effigies and general purposes. Other woods used were *Cupressus sempervirens*, *Tetraclinis articulata*, *Taxus baccata*, *Cordia*, *Ficus Sycomorus*, *Tamarix*, *Dalbergia* and others.—*Chas. H. Otis*.

5706. RICE, KATHERINE G. Bibliography on the preservation of fruits and vegetables in transit and storage, with annotations. (Mimeographed) U. S. Dept. Agric. Lib. Bibliogr. Contribut. 4. 2 + 76 p. 1922.—Literature references are classified under the following headings: Cold storage, common storage, decay and physiological disturbances, dehydration, handling, ice house and cold storages, packing, packages and grades, pit and trench storage, precooling, prevention of freezing in transit, refrigerator cars, ripening and respiration, standardization, technology, and transportation.—*Frederick V. Rand*.



5707. STONEMAN, BERTHA. The search for crucial instances in botanical procedure. *South African Jour. Sci.* 20: 74-95. 1923.—From time to time vague unrest is expressed lest all is not well in the botanical world. There is a present tendency to decry the morphologist and the plea is urged to place greater emphasis upon physiology. The systematist is seldom mentioned in serious botanical conferences. The wealth of conflicting evidence on various problems, a few only of which have been touched upon, affords most invigorating food for reflection and stimulus for investigation. Full confidence in the botanist is restored.—*E. P. Phillips.*

## BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ARTHUR H. GRAVES, *Assistant Editor*

(See also in this issue Entries 5726, 5729, 5829, 5909, 5987)

5708. CLUTE, WILLARD N. Plant names and their meanings. XIX. Ericaceae—11. *Amer. Bot.* 30: 54-63. 1924.

5709. GUNDERSEN, ALFRED. Families of dicotyledons. *Brooklyn Bot. Gard. Leaflets* 12: 1-4. 1924.—This is a short, concise key to the most important families of dicotyledons, planned primarily for the use of outdoor classes in the Brooklyn Botanic Garden.—*A. H. Graves.*

5710. HENSON, E. R. Experiments with the problem method of teaching. *Jour. Amer. Soc. Agron.* 15: 448-453. 1923.—Handling courses in farm crops by the problem method requires more of the instructor's time in preparation and a wider acquaintance with the subject, but the greater activity and interest of the studies is the reward for the extra trouble.—*F. M. Schertz.*

5711. KUNHIKANNAN, K. Agricultural education in India. *Jour. Madras Agric. Students Union* 11: 293-298. 1923.—The author considers the present system of agricultural education in India defective, and points out that the main effort should be directed towards the training of students from the middle and laboring classes instead of encouraging capitalistic farming for which conditions are not well suited.—*P. S. Jivanna Rao.*

5712. PADHORSKY, I. Der österreichische Naturschutzpark im Dienste der Wissenschaft. [The Austrian natural park in the service of science.] *Wien. Allg. Forst- u. Jagdzeitg.* 40: 237-238. 1922.—This advocates the establishment of a park area to be maintained in a natural condition in the upper Staubachtales, Salzburg Highlands. The area is representative of many conditions and has a very rich flora, with an interesting distribution of Swiss stone pine, and other species. Succession is shown in many stages, more clearly than almost anywhere in the whole Alpine region.—*F. S. Baker.*

5713. THOMSON, J. ARTHUR. *Everyday biology.* x + 262 p. George H. Doran Co.: New York, 1924.—This is intended to serve as an introduction to the biological way of thinking. The 20 chapter headings are: The emergence of life, the unread riddle of life, life in motion, the energies of the body, food-getting and food-using, the nervous system, how many senses are there, animal behaviour, the blood, hot and cold, hormones, the stones and mortar of the house of life, cocks and hens, individuality and specificity, the living past and heredity, the influence of habits and surroundings, the emergence of the new, growth and its ripple marks, infection and disease, the length of life's tether.—*C. S. Gager.*

## CYTOLOGY

GILBERT M. SMITH, *Editor*

(See also in this issue Entries 5820, 5850, 6160, 6162, 6226)

5714. DEHORNE, ARMAND. Observations sur *Chaetogaster diaphanus* à maturité sexuelle. [Observations on *C. diaphanus* at sexual maturity.] *Compt. Rend. Soc. Biol.* 88: 886-838. 1923.



5715. DEHORNE, ARMAND. Le groupement ovocytaire et la structure de son cytophore chez *Chaetogaster diaphanus*. [The ovocyte grouping and structure of the cytophore in *C. diaphanus*.] *Compt. Rend. Soc. Biol.* 88: 888-890. 1923.

5716. FAURE-FREMIET, E., ET H. GARRAULT. Constitution de l'oeuf ovarien de *Patella vulgata*. [Constitution of the ovarian egg of *Patella vulgata*.] *Compt. Rend. Soc. Biol.* 88: 1183-1186. 1923.

5717. KIRCHENSTEINS, AUGUST. Structure intérieure et mode de développement des bactéries. [Interior structure and mode of development of bacteria.] 90 p., 7 pl. Les presses Universitaires de France: Riga, 1922.—After a thorough critical discussion of the literature the methods are described in detail (p. 33-50), which have proved most suitable for studying the inner structure of bacterial cells; the 2nd half of the book presents the results obtained with these methods. The microchemical reactions as well as the morphological appearance of the granules constantly present in bacterial cells, either finely dispersed or united into 1 body, and especially their participation in the development of vegetative cells as well as in the formation and germination of spores, are accepted as definite proof of their nuclear character. Bacterial cells can no longer be considered to be "cytodes." It is recommended to use the terms chromatin or nuclear granules instead of metachromatic granules. A list of 109 references is given.—*F. Löhnis*.

5718. LENOIR, MAURICE. Sur l'existence de deux variétés de chromatines dans le noyau des cellules des plantes vasculaires. [The existence of two kinds of chromatin in the nuclei of vascular plants.] *Compt. Rend. Soc. Biol.* 88: 771-772. 1923.—There is a fundamental unity between the chromatin of the network and of the nucleolus, since each can give rise to the other. Both merit equally the name of chromatin. Since, however, they represent a different aspect, they should be distinguished. Each has its own role in mitosis and should be named separately. The terms reticulín and nucleolín are proposed.—*Oran Raber*.

5719. MAIGE, A. Variations du noyau pendant la digestion de l'amidon, à diverses températures, chez le haricot. [Variation of the nucleus during starch digestion at different temperatures in the kidney bean.] *Compt. Rend. Soc. Biol.* 88: 1149-1152. 1923.—Bean embryos placed on wet blotters, permitted to develop until the starch is digested and then put in a 10% saccharose solution show changes in size of the nuclei and nucleoli that vary with the temperature. At 10° the nuclei and nucleoli increase in size; at 24° and 34° they decrease in size.—*Oran Raber*.

5720. PENLAND, C. W. T. Cytological behavior in *Rosa*. *Bot. Gaz.* 76: 403-410. *Pl.* 21-22. 1923.—This investigation attempts to discover the cause of polyspory by tracing the history of microspore formation, and to explain the irregularity in a genus possessing many hybrids. While the normal haploid chromosome number in *Rosa* is seven, many orthoploid and anorthoploid forms based on this number are found. The American *R. blanda*, *R. macounii*, *R. gymnocarpa*, *R. nitida* and *R. carolina* are diploid; the European *R. penulina*, *R. cinnamomea*, and varieties of *R. spinosissima* are tetraploid; the American *R. nutkana* and the European and American *R. acicularis* are hexaploid; and the form *R. dumetorum* is pentaploid. Chromosome numbers in *R. rubrifolia*, *R. junzilli*, *R. alba*, *R. gayana*, *R. harissoni*, *R. acicularis* × *rugosa* and other garden hybrids have not been determined. This indicates that European roses manifest greater hybridization than do American roses. The early prophase in the reduction divisions of the pollen mother cell, are the same in all roses. The first great diversity appears in the segregation of the chromosomes and in the beginning of the diakineté phase. Normal species show 7, 14, or a larger number of paired chromosomes which arrange themselves on the equatorial plate with great regularity. Anaphase and telophase appear to be regular, and the tetrad is formed. In species with an abnormal cytological behavior, differences in the formation of the spindle and the resulting microspores occur. In diakinesis, univalent chromosomes are found among bivalents. These have lost their motility even in the anaphase, and are found at any place on the spindle or even in the cytoplasm. Many of them lie outside the membrane of the daughter nuclei and in the subsequent divisions of the pollen mother cell they produce their own spindles. Sometimes as many as 10 or 12 microspores, or even more, come from the same pollen mother cell. These smaller microspores become the shrivelled sterile grains; in other cases the entire anther may collapse without the formation of any normal microspores. Several widespread American



species are characterized by relatively normal meiosis. Since polyspory accompanies polyploidy, and the forms with sterile pollen always show polyspory, the proof of a physical basis for mutation apparently rests in the supernumerary univalent chromosomes.—*Wanda Weniger*.

5721. SHOWALTER, A. N. La fécondation chez le *Riccardia pinguis* (L.) S. F. Gray. [Fertilization in *Riccardia pinguis* L., S. F. Gray.] Compt. Rend. Soc. Biol. 88: 975-977. 3 fig. 1923.—Preliminary observations seem to indicate that the colloidal mass of concentrated chromatin which makes up the nucleus of the antherozoid passes without change into the nucleus of the oösphere where it gradually breaks up and becomes a part of the nucleus of the zygote.—*Oran Raber*.

5722. VOÏNOV, D. Sur une nouvelle inclusion cytoplasmique prenant part à la formation du perforateur dans les éléments males du *Gryllotalpa vulgaris*. [A new cytoplasmic inclusion taking part in the formation of the perforator in the male elements of *G. vulgaris*.] Compt. Rend. Soc. Biol. 88: 1348-1350. 1923.

## ECOLOGY AND PLANT GEOGRAPHY

GEO. D. FULLER, *Editor*

(See also in this issue Entries 5797, 5803, 5918, 6115, 6151, 6152, 6170, 6240, 6258, 6281, 6322)

### GENERAL, FACTORS, MEASUREMENTS

5723. ALBO, G. Come vivono le piante nelle diverse statzioni della Sicilia meridionale-orientale. [How plants live in the different regions of middle and eastern Sicily.] Nuovo Gior. Bot. Ital. 30: 157-172. 1923.—With the distribution of plant life depending on temperature, moisture, light and the physical and chemical conditions of the soil, the following division into stations was suggested: First station. The amount of available water forms the limiting factor; therefore, plants with xerophytic habits and a high osmotic pressure of the cell sap will be able to compete.—Second station. The limitation is set by the duration of the period of sufficient rainfall; it coincides with the growth and development of annuals.—Third station. Here both annuals and perennials live equally well; the limiting factor for either is the temperature.—Fourth station. The concentration of the soil solution is a barrier to plants with low osmotic pressure of the sap.—All factors being equal the distribution of plants is limited by the amount of water available to the plant in some form or other.—*Ernst Artschwager*.

5724. COOPER, WILLIAM S. The ecological life history of certain species of *Ribes* and its application to the control of the white pine blister rust. Ecology 3: 7-16. 3 fig. 1922.—The writer discusses the climax forest species of the New England region, naming *Picea rubra*, *P. canadensis* and *Abies balsamea* for the northern part and *Tsuga canadensis*, *Fagus grandifolia*, *Betula lenta* and *B. lutea* for the eastern part while *Castanea dentata* and several species of oak and hickory occur in the southern part of the latter section. These two phases of the eastern deciduous forest differ in the abundance of species and numbers of *Ribes*, the more southern part having fewer. The species of *Ribes* are chiefly gooseberries, *R. cynosbati*, *R. hirtellum* and *R. rotundifolium*. These plants occur mainly in old pastures or orchards and abandoned lands and rarely in climax forest, with a corresponding decrease in fungous infection as the climax forest habitat is reached. The disseminating agencies are wind, gravity, running water and animals (birds and rodents). Analyses of bird stomachs showed that forest birds do not eat the fruit but the birds of the open spaces do and these are the more usual carriers. Dissemination by these agencies occurs mainly in the early stages of forest succession. Most of the region studied will support *Ribes*, persisting from old plantings, for long periods but forests once cleared of *Ribes* plants are reasonably safe from reinfection if old pastures, etc., where birds frequenting such places stop, are carefully watched and seedlings destroyed.—*H. H. M. Bowman*.



5725. COSTER, CH. Lauberneuerung und andere periodische Lebensprozesse in dem trockenen Monsun-Gebiet Ost-Java's. [Foliation and other periodical life processes in the dry monsoon-region of East Java.] Ann. Jard. Bot. Buitenzorg 33: 117-190. Pl. 17-19. 1923.—The author has made an extensive and intensive study of growth and foliar periodicity in 52 species of plants growing near Toebean on the north-east coast of Java. The plants studied are chiefly large dicotyledonous trees of which several thousand species were examined. In a series of experiments it was attempted by artificial means—narcotics, faulty nutrition, etc.—to break the rest period. Toebean lies in a narrow, dry zone on the north-east coast of Java where there is a marked dry monsoon which lasts five months—June to October. May and November are intermediate months with December to April constituting the rainy season. Annual changes in light and temperature are slight so that the climatic cycle is essentially one of rainfall and humidity. Of the many plants studied, some striking differences in growth periodicity were observed. *Artocarpus communis* grows without interruption throughout the year. No decrease in foliar activity or in the production of fruit is to be observed even in the dry period. This condition is also true of several other species, e.g., *Ficus septica*, *Averrhoa Bilimbi*, *Acalypha Wilkesiana*, and *Carica Papaya*. In several other instances is the seasonal variation in leaf growth also slight. Some plants, on the other hand, show a very striking seasonal periodicity in leaf production. *Pithecolobium umbellatum*, for example, rests for seven months, January to August, including the greater part of the dry season. *Bombax malabaricum* also has a pronounced rest period coinciding with the dry season. The "kapok" tree, *Ceiba pentandra*, has likewise a definite rest period coincident with the dry season. For two or three months this large tree is completely defoliated, during which time it blossoms and fruits.—The author concludes that, in the main, flowering follows shoot activity; that is, those species with uninterrupted growth flower continuously, while those species whose shoot growth shows marked periodicity exhibit also periodic flowering. A complete independence of flowering from climatic factors is not found; each species rather produces its flowers in unison with the climate, either in the dry season, rainy season, or in the transition period between the two. Artificial stimuli fail to break the rest period of *Bombax* when applied at the beginning of the dry season immediately after leaf fall, but when the tree has flowered and set fruit and the rest period is near an end, mere placing of a shoot in water is sufficient to open the leaf buds. The rest period of *Tectona grandis* is readily disturbed by artificial means. The pronounced periodicity in shoot growth of *Mangifera indica* can be broken by watering with a Sachs' nutrient salt solution and by defoliation. Rhythm is not innate in the organism but can be disturbed. It is not the "cause" but the result of the interaction of external and internal factors. The "Anlage" of the rhythm is heritable, the periodicity itself cannot be regarded as heritable since it can be disturbed. Rest is a retardation phenomenon which can have external and internal causes; the external causes may be water and salt deficiency, light deficiency, or cold; the inner causes may be hormones and unknown correlations which, among other things, determine changes in root activity.—William Seifriz.

5726. FORBES, STEPHEN A. The humanizing of ecology. Ecology 3: 89-92. 1922.—This is a plea for a broad interpretation of ecology as a science and its widespread application to problems relating to man's welfare. The writer uses as an illustration the harmonious working together of an ecologist and an entomologist to control the ravages of the codling moth, which is an economic object. Suggestions are given for the simplification of terms used in ecology, for its introduction into curricula and for the admission into an ecological fellowship of workers of every phase of applied ecology.—H. H. M. Bowman.

5727. GLEASON, HENRY ALLAN. On the relation between species and area. Ecology 3: 158-162. 1 fig. 1922.—The article aims to be a demonstration of the fallacy of the equation originated by O. Arrhenius of Stockholm to show the relation between the number of species of plants occurring in a definite area and the area itself. By solving the equation either for certain associations described by Arrhenius or for associations studied in Michigan by the writer the calculated results obtained show a much greater number of species than an exact count of the area *in situ* reveals. The discrepancy of the Arrhenius equation is apparently due to the lack of uniformity of occurrence of species in such areas and quadrats in nature, and also to the selection of too small areas. The writer offers data on the aspen association



of Michigan, including a chart, to show that the number of species does not increase in proportion to an increase in the area examined, according to the rapid rate of mathematical progression suggested by the equation calculated by Arrhenius.—*H. H. M. Bowman.*

5728. HÄYRÉN, ERNST. Studier över förorenigens inflystande på strändernas vegetation och flora i Helsingfors hamnområde. [The influence of pollution on the strand vegetation and flora in the vicinity of the harbor of Helsingfors.] Bidrag K. Finlands Nat. och Folk, Utgifna Finska Vetenskaps-Soc. 80: 1-128. 4 fig. 1921.—The vegetation is studied with reference to the effects of sewage pollution. The plants are classified in six groups: polysaprobies, strong mesosaprobies, weak mesosaprobies, oligosaprobies, indifferents and catharobes—following the system of Kolkwitz and Marsson. The white thread bacteria are polysaprobic; a number of blue-green algae attain their maximum development under mesosaprobic conditions, while the Chlorophyceae, including such species as *Enteromorpha crinita*, *Ilea fulvescens* and *Ulothrix subflaccida*, are spoken of as, in significant numbers, weak mesosaprobies and oligosaprobies. Certain diatoms are especially abundant in slightly polluted localities, while the red and brown algae and Characeae seem to be strict catharobes. The associations are discussed in detail and the value of certain plants as definite indicators of the degree of pollution is emphasized. Finally, all forms mentioned, 157 in all, representing 11 groups of Thallophytes as well as mosses and flowering plants, are discussed individually, with brief notation as to appearance and size, together with localities and dates. Six pages are devoted to a German summary.—*George W. Martin.*

5729. LIVINGSTON, B. E. Research methods in ecology. [Rev. of: BATES, C. G., AND R. ZON. Research methods in the study of forest environment. U. S. Dept. Agric. Bull. 1059. 1-209. 4 fig. 1922.] Ecology 5: 99-101. 1924.

5730. LLOYD, F. E., AND G. W. SCARTH. The bog-forests of Lake Memphremagog [Quebec]: Their destruction and consequent successions in relation to water levels. Trans. Roy Soc. Canada III, 16: 45-48. 1922.—The cause of the destruction is traced (1) from the nature of the damage, and (2) from the date of its operation. A survey of levels in comparison with more normal areas shows that at present the summer levels both of lake and water table allow ample margin for healthy growth of coniferous bog forest. Spring flood level is relatively rather high, and there is evidence of its being formerly still higher, but this in itself and for a limited term of years is not destructive. The uneven, eroded aspect of the forest floor suggests a washing out of soil accompanied by decay of humus, such as might be occasioned by yearly inundation by spring floods; it is the consequent lowering of ground level rather than a rise of summer water level that is the immediate cause of injury. The inception and progress of the destruction relative to time is studied by measuring annual growth increment in a number of trees still surviving. The rate of growth began to fall off about 70 years ago and fell most rapidly about 30 years ago. The conclusion is that the main cause of destruction is not the erection of a dam at the outlet of the lake, as usually supposed, but the progress of deforestation, causing a change in the amplitude of seasonal fluctuation.—The apparently retrogressive succession in the vegetation is also described.—*G. W. Scarth.*

5731. SHELFORD, VICTOR E., AND FLOYD W. GAIL. A study of light penetration into sea water made with the Kunz photo-electric cell, with particular reference to the distribution of plants. Publ. Puget Sound Biol. Sta. 3: 141-176. 1922.—In clear, calm weather, between 10 a.m. and 2 p.m., about 25% of the light is shut out by the surface, thus contradicting Regnard's statement that about 50% is excluded. In rough weather this may reach 70% or more. Only 8-10% of the shorter wave lengths reach a depth of 10 meters, thus reducing Regnard's figures. If light determines the lower limit of organisms it may be expected that in water with roughened surface this lower limit will be nearer the surface than in calm waters.—The amount of light of different wave lengths at various depths may be calculated from measurements with the potassium-hydrogen photo-electric cell, and the amount and source of energy estimated. During mid-day the maximum energy for photosynthesis at 5-25 meters depth lies in the blue. The zone of brown algae, with few exceptions, lies between 5 and 20 meters. The majority are around 10 meters where the shorter wave lengths are about 10% and the red, about 0.99% of full sunlight. The zone of red algae, with few exceptions, lies between 10 and 30 meters. The majority are at 10-25 meters where the shorter wave lengths are between 10% and 2% and the red, between 0.99% and 0.0032% of full sunlight. In water usually rough, the depth of the algal zone may be decreased to practically zero.—*T. C. Frye.*



5732. SHULL, CHARLES A. **The formation of a new island in the Mississippi River.** Ecology 3: 202-206. 2 fig. 1922.—A detailed account is given of the origin and growth of an island in the Mississippi River near Belmont, Missouri. In April 1913, during the recession of a heavy flood, a large barge was stranded near the opening of a narrow channel running by Wolf Island. The obstruction started deposition which had been rapidly augmented during subsequent stages until after a lapse of 6 years an island nearly three-fourths of a mile long with average width of about twelve hundred yards has been formed, containing about sixty acres. Each flood deposits about 16 inches of silt. The island now requires a 43 foot stage of the river in order to receive additional deposits on the flood plain. The barge lies buried near the head of the island at the place where it stranded. The older portions of the island are covered by a cottonwood thicket. The trees are 4-8 inches in diameter and 30-40 feet tall, forming a thick and nearly pure stand. Their uniformity suggests a single season's seeding. A few willows occur. Other vegetation is scanty or absent. On the newer successive lateral deposits along the main channel there is a terrace-like vegetation of willows and cottonwoods sometimes showing several stratifications. The narrow channel above the island is now being filled and a younger zone of cottonwoods is forming along the new shore line. It is believed that a few years only will be needed to obliterate this channel and join the island to the mainland.—*T. J. Fitzpatrick.*

5733. SUTTON, C. S. **Cradle Mountain (Tasmania) and its flora.** Victoria Nat. 40: 131-137. Pl. 11-13, map. 1923.—A general discussion of the topography, climate and ecology is given.—*Wm. Randolph Taylor.*

5734. TAYLOR, WALTER P. **A distributional and ecological study of Mount Ranier, Washington.** Ecology 3: 214-236. 4 fig. 1922.—Mount Ranier is a massive eminence, chiefly basaltic in character, with a warm humid climate and extremely heavy snowfall (790 inches) which results in the formation of numerous glaciers. Although recognizing the limitations of the method, the writer has classified the flora and fauna into life zones. Four life zones mapped on broad lines with temperature as the basic factor are represented: (1) The Transition, the smallest and least important, occupying about 6 square miles below 3000 feet; (2) the Canadian, the heavily timbered area, characterized by *Tsuga heterophylla*, *Pseudotsuga mucronata*, and *Thuja plicata*, between 2000 and 4500-5000 feet; (3) the Hudsonian, characterized by *Abies lasiocarpa*, *Tsuga mertensiana*, *Pinus albicaulis*, and *Abies amabilis*, and wide expanses of sub-alpine meadows; (4) the Arctic-alpine, the region above timberline which occurs at about 6500 feet. Lists of the more important trees, shrubs, and herbs of each zone are given. Plant and animal distribution on the mountain is also shown by habitat with its association—determined chiefly on water-relations. These are (1) hydrophytic—stream, stream border, lake, lake shore, and swamp; (2) mesophytic—meadow, forest, and burn; and (3) xerophytic—alpine ridge, pumice slope, rock slide, and glacier. Each habitat is briefly discussed and the characteristic plants and animals are given. Special consideration is given to certain areas including the drier north-eastern portion of the mountain (the general mountain climate being extremely humid), and timberline. Depth of snow seems to be more important than temperatures, wind, or other factors in causing timberline.—*J. E. Weaver.*

5735. THONE, FRANK. **Evaporation rates on rock canyon walls.** Bot. Gaz. 76: 419-424. 1 fig. 1923.—Atmometric observations were made from July 1 to September 20 at 4 stations representing increasing degrees of exposure on the walls of a canyon in the Starved Rock region, Illinois. The records show a similar seasonal march in evaporation rate for all 4 stations, with the high point in mid-July and the low point in September. In contrasting the stations, it was found that during the period of highest evaporation rates the ratio among the 4 stations, taken in ascending order, was 100:144:286:337. At the uppermost exposed station an appreciable increase in evaporation due to insolation was obtained.—*B. W. Wells.*

5736. THORN, L. **Excursion to Moorooduc and Frankston.** Victoria Nat. 40: 145-147. 1923.—A general discussion of the plants and insects is given.—*Wm. Randolph Taylor.*

5737. WEAVER, J. E., AND J. W. CRIST. **Relation of hardpan to root penetration in the great plains.** Ecology 3: 237-249. 5 fig. 1922.—Results are given of investigations made mostly at Burlington, Colorado, with analyses of hardpan from Flagler, Colorado, and Colby, Kansas. The hardpan lies at a depth of 1.4 to 3 feet, and varies in thickness from 8 to 18 inches. Tables give the chemical and mechanical analyses of the soils in foot samples to a

depth of 6 feet. Other data include moisture constants and water-content in excess of hygroscopic coefficient. At Burlington the annual rainfall is about 17 inches. Hardpan lies at or near the normal depth of water penetration. During times of greater rainfall the hardpan becomes moist and loses its qualities which, however, reappear as the soil dries. In certain localities the hardpan seems to have its origin in the calcareous nature of the soil but in other localities the physical properties of colloidal clay along with the carbonates are the determining causes. Usually, root distribution is only above the hardpan, but in times of greater water penetration roots pass through the hardpan to a depth of 5 or 6 feet.—*T. J. Fitzpatrick.*

### STRUCTURE, BEHAVIOR, SYMBIOSIS

5738. AZZI, G. **The problem of agricultural ecology.** *Monthly Weather Rev.* 50: 193-196. 1922.—Up to the present time too little attention has been paid to the study of environment in agriculture. A method is proposed for investigations in agricultural ecology, defined as the study of the meteorological factors in air and soil in relation to the development and yield of plants. The aim of the study is to establish for each cultivated plant the genetic factors responsible for its behavior in relation to environment and the agents having the greatest influence on yield. Determinations of the optimum date of sowing and the relation between environment and growth should be taken during and following critical periods. There must be established critical periods, phenoscopic averages, percentages of probability of the various meteorological phenomena by 10-day periods, and decrease in yield due to unfavorable conditions.—*E. N. Munns.*

5739. CHRISTENSEN, C. E. **On the behavior of certain New Zealand arboreal plants when gradually buried by river shingle.** *Trans. and Proc. New Zealand Inst.* 54: 546-548. *Pl.* 51-53. 1923.—Plants having the ability to produce adventitious roots are able to survive burial. Abrasion of the bark by rapidly moving shingle is sometimes fatal.—*Wm. Randolph Taylor.*

5740. [GALE, G. W.] **Researches on the vegetation of Natal. Series 1, Section 1. The measurement of the size of the aeration system of the leaves of certain Natal plants by the injection method. Section 1.** *Mem. Bot. Surv. South Africa* 5: 5-22. 1 fig. 1923.—An account is given of previous work on the same subject, some of which is called into question. A method of estimating intercellular space content of leaves by injection of 4% alcohol under reduced pressure, is described. Critical experiments show that it is necessary to work only with leaves whose full turgidity is guaranteed by their having been previously kept in a saturated atmosphere for some time. The intercellular space content is best expressed as a percentage of live weight under conditions of maximum turgor. Correlative experiments on the power of leaves to absorb the injection fluid, and on their relative water-content are described, and illustrated graphically, and their possible significance is discussed. Notes are given on the applicability of the method to over 40 species of Natal plants, a table of results is given for 28 species and the degree of variability of each species is calculated. The results indicate that (1) in contrast to the conclusion of McLean, all plants show considerable powers of variation in this particular feature; (2) in contrast to the views of Haberlandt and Areschoug, a high degree of development of intercellular space is not a simple response to mesophytic environment, but is probably related to other factors, among which, lack of sufficient soil aeration is probably important; (3) shade leaves have in reality no greater development of intercellular space than sun leaves, although, owing to a difference in the specific gravity of the leaf substances, there may be an apparent difference when live weight is used as the standard in terms of which to express results; (4) species which appear early in plant successions, i.e., those which are successful in varied and unstable habitats, have a greater degree of variability in their physiological structure than those which appear later.—*L. J. Goldblatt.*

5741. GARSIDE, S. **The pollination of *Satyrion bicallosum*, Thunb.** *Ann. Botus Herb.* 3: 147-154. *Pl. vi*, 12 fig. 1922.—In a review of the scanty literature on South African orchid pollination, the author states that there is no record of an insect having been seen to enter and remove the pollinia from a South African orchid, though instances are cited of insects having been caught with attached pollinia.—A description is given of the floral mech-



anism of *Satyrium bicallosum* Thunb. Specimens of a fly, *Sciara* sp., were seen to enter the flower and to emerge with pollinia attached to the thorax. It is probably attracted by an extra-cellular secretion on the hairs at the base and sides of the spur. These flies appear in large numbers at dusk, and fly rather actively. It seems probable that cross pollination takes place at nightfall, and that once a fly has a pollinium attached, it does not usually take flight but runs from flower to flower. Almost all the flowers from the lower part of the spike have both pollinia removed after the flower has been open for a night, and as the plants set seed abundantly, pollination must be very effectively carried out.—*L. J. Goldblatt.*

5742. GERHARDT, KARL. Zur Theorie der Schutzmittel gegen Thierfrass by Pflanzen. [Protective adaptations in plants against animals.] Biol. Centralbl. 40: 241-248. 1920.—This is a review and discussion especially of the contributions of Stahl and his students against the theory that the possession by plants of such features as spines, hairy coverings, silicious coatings, and certain chemical substances in the tissues, are to be interpreted as adaptive protection against attacks by animals. Gerhardt thinks that Stahl's view is to be sustained; and that it is reinforced by the work of Benecke and by his own interpretation of the significance of insect galls which Gerhardt says in this connection "may be regarded as the product of an embittered contest." Heikertinger bases his contention against Stahl's interpretation on the case of specialized feeders (monophagous insects), such as *Phyllocera* and the potato beetle. In such cases, a plant may not be attacked simply because it is outside the range of inherited taste sense of the insect. In Heikertinger's view every species as such, unprotected and unresisting, pays its tribute, overproduction is checked, and the balance in nature is maintained.—*William L. Bray.*

5743. HEINRICHER, E. Wie erfolgt die Bestäubung der Mistel, Scheiden ihre Blüten wirklich Nectar ab? [How is mistletoe pollinated, do its flowers really secrete nectar?] Biol. Centralbl. 40: 514-527. 1 fig. 1920.—Koelreuter, Loew, and Kirschner described the flowers of *Viscum Album* as entomophilous. The alleged nectar glands were described and the secretion of nectar was seemingly confirmed. Heinricher's study of mistletoe (*Flora* 11: 1919) led him to conclude that these flowers are both anemophilous and entomophilous. Von Tubeuf, in a study of *Arceuthobium* (1919), considers also the floral ecology of *Viscum Album*, asserting that its flowers are strictly entomophilous: Heinricher thereupon instituted (1920) an intensive study of the mistletoe in the Botanical Garden at Innsbruck, covering the full flowering period from February 24 to March 23. Observations were made about 9:00 A.M., 11:30 A.M., and between 4:00 and 5:00 P.M. daily, on a large number of mistletoe plants on several different hosts. The results follow: There is no nectar secretion. The pseudo-nectar drops figured by Tubeuf are due to rain or fog, and were seen only in wet weather. A slight sugar content in such drops is probably due to chemical changes in the cell wall. Insect visitors are few and their visits mostly not related to the flower. Pollination by them would thus be accidental. Occasionally honey bees and bumble bees seek pollen but never visit the pistillate flowers and so do not bring about pollination. While the pollen grains are large and papillate, tending to adhere in clumps, they readily fall apart, and the anthers are quickly emptied by a slight breeze. Earlier experiments (1919) showed that even when shut off from insect visits by gauze covers the mistletoe sets fruit freely. Entomophily and parthenocarp are thus excluded as factors. The author suggests that the alternative to wind pollination is somatic parthenogenesis. The latter remains to be investigated.—*William L. Bray.*

5744. HOLBERT, JAMES R., AND BENJAMIN KOEHLER. Anchorage and extent of corn root systems. Jour. Agric. Res. 27: 71-78. 5 pl., 1 fig. 1924.—Data are given primarily on the nature of the root systems of 3 inbred strains of Yellow Dent corn: (1) A good strain, (2) a strain susceptible to root rot, and (3) a strain susceptible to leaf firing. These strains had been inbred for 5 to 6 years, all grew to nearly the same height, and were of a normal green color. The good strain stood erect in the field under various weather conditions, while the others lodged easily. It was found that the good strain possessed a greater number of main roots and of lateral roots, and the lateral roots were longer than in the other strains. Histological sections of the roots of the good strain were compared with sections of the roots of the strain susceptible to root rot. Intercellular spaces were practically absent in the former while in the latter they were abundant. In order to get an approximation of the extent of the

root systems without the time consuming method of digging up the plants, a machine was devised by means of which plants could be pulled from the ground, and the pulling resistance of the plants, as indicated on a dial, recorded. Data thus obtained were found to correlate very closely with actual measurements of the root systems.—*James R. Holbert.*

5745. KRAEPELIN, H. *Die Sprengel'sche "Saftmal Theorie."* [The nectar guide theory of Sprengel.] *Biol. Centralbl.* 40: 120-141. 1920.—The author reviews the various claims made by Sprengel and others as to the efficiency of so-called nectar guides in directing visiting insects to nectar in flowers. The occurrence and combinations of colors and color contrasts is statistically handled in a series of tables. A large amount of observational and experimental data gained by an intensive and prolonged study of various aspects of the question in the Munich Botanical Garden is presented, supported by discussion and citation of the work of numerous contributors in the field of flower ecology. The various forms of nectar guides occur only one-half as frequently on actinomorphic as on zygomorphic flowers, the color contrasts increasing with floral complexity. Nectar guides do not occur on all nectar-secreting flowers, nor do all flowers with nectar guides secrete nectar. Red is most frequently present in nectar guide patterns and in the ground color of the flower. That nectar guides are not indispensable in guiding insects to nectar is shown in the case of filled flowers of *Hibiscus syriacus*, where visiting insects promptly sought the nectar glands at the base of the outer petals although the numerous inner petals (transformed stamens) were equally brilliantly colored and made access to the bases of the outer ones more difficult. Furthermore, in *Erodium Manescavi*, removal of the dorsal, nectar-guide-bearing petals did not check visits of nectar-seeking insects, while removal of the ventral petals having no nectar guides did. With respect to the ecological significance of these contrast color markings, the author concludes that in relatively few cases are they of significance in directing the insect to the nectar, but that their chief role lies in enabling the visiting insect quickly to discern the proper alighting place on the flower.—*William L. Bray.*

5746. ROBERTSON, CHARLES. *The sunflower and its insect visitors.* *Ecology* 3: 17-21. 1922.—The article, chiefly entomological, is a full record, kept by several observers since 1894, of the insects which visit various plants of the Compositae—especially *Helianthus*, *Silphium*, etc. These composites are visited mainly by long-tongued insects, especially bees.—*H. H. M. Bowman.*

#### VEGETATION

5747. CAMPBELL, DOUGLAS HOUGHTON. *Australian botanical notes III. New Zealand.* *Amer. Jour. Bot.* 10: 515-536. 1 pl., 6 fig. 1923.—The author gives a brief account of the geography and climatic conditions of New Zealand. He describes the Kauri forests of the North Island and the more important plants found in them, particularly the region about Wellington, its botanical garden and beech forest. In the South Island, the author visited Canterbury, where the country is chiefly open grassland; crossed over Arthur's Pass, with its sub-alpine scrub, and spent some time in the rain-forest of the west coast. The characteristic plants of each of these regions are described and the abundance of lianas and epiphytes in the rain-forest especially noted. The Malayan, Australian and Fuegian elements in the flora are discussed and the author suggests the probable manner in which each reached New Zealand.—*E. W. Sinnott.*

5748. HANSON, HERBERT C. *Prairie inclusions in the deciduous forest climax.* *Amer. Jour. Bot.* 9: 330-337. 2 fig. 1922.—In the deciduous forests of the central states small inclusions of prairie frequently occur, usually on southern slopes. The author studies two of these near Peru, in southeastern Nebraska. The evaporating power of the air as measured by the atmometer, was much greater on the prairie than in the adjacent shrub zone or forest, and the soil-water content distinctly less. The data presented tend to prove that the chief factors in the maintenance of these prairie inclusions from invasion by the surrounding shrubs and trees are the great evaporating power of the air caused by exposure to sunlight and prevailing winds, and the low soil-water content, often falling below the available point.—*E. W. Sinnott.*



5749. OSVALD, HUGO. *Die Vegetation des Hochmoores Komosse.* [Vegetation of the Komoss raised bog.] *xxiii + 436 p., 11 pl., 114 fig., 1 map.* Doctor's thesis. Almquist & Wicksells: Upsala, 1923.—Although by no means the largest, the Komoss Hochmoor, 13 x 7 km. in its greatest dimensions and covering an area of 4500-5000 hectares (17-20 sq. miles), is in many respects the finest example of its kind in southern Sweden. The present account represents a comprehensive ecological survey of its vegetation. Following a discussion of the geographical features of the area (topography, hydrography, geology, climate, and influence of culture), the author presents a detailed account of the associations, of which no less than 164 are distinguished. The descriptions of the various individual associations are accompanied by careful analytical tables of plants, based on the habitat-survey method of Hult and Sernander. In presenting this material, the author has followed the lead of Du Rietz and other Swedish ecologists, classifying the associations primarily from the physiognomic point of view into various "formations." Following the survey of the associations and formations as abstract vegetation units, account is taken of the distributional relations of the associations in the field. From this point of view numerous "association complexes" are recognized and the relative importance of the various constituent associations is worked out with mathematical exactness. Emphasis is also laid upon the successional relationships of the associations which go to make up the different complexes. The work concludes with a general discussion of the regional distribution of the Hochmoortype.—*G. E. Nichols.*

5750. PATON, D. J. *The plants of the "Whipstick" scrub, Bendigo.* *Victoria Nat.* 40: 189-204. *Map.* 1923.—The shrubby Eucalypts, underscrub, herbaceous plants and general flora and ecology are discussed. A classified list of the plants of the district is given.—*Wm. Randolph Taylor.*

5751. RASMUSSEN, R. *Lidt om Caltha palustris poa Faererne.* [*Caltha palustris* of the Faro Islands.] *Bot. Tidsskr.* 38: 127-136. 1923.—The Faro Islands possess a scanty vegetation of about 350 plants. Ostenfeld lists 342 species, 44 of which are introduced. Since 1908, 7 new species have been found. During the summer, the flowering plants are conspicuous, *Caltha palustris* being particularly noticeable during May and June. This is described as to its distribution and the development of the leaf and flower bud. A table with the blossoming and fruit setting dates from 1902 to 1923 is given. The difference between the vegetation of the northern portion and that of the southern section of the islands is due to the moist, hilly topography of the former.—*A. L. Bakke.*

5752. RIGG, GEORGE B. *A bog forest.* *Ecology* 3: 207-213. *1 fig.* 1922.—A late stage of bog succession in a 3-acre bog near Victoria, B. C., is described. *Pinus contorta* with trees 6-10 inches in diameter in pure stand covers the area. *Sphagnum* is no longer found living. The undergrowth consists of a rank development of *Ledum groenlandicum*, *Gaultheria shallon*, and a few *Betula glandulosa*. Other plants are not common. Beneath the decaying layer of pine needles *Sphagnum* was found in a layer about a foot thick; a brown, plastic, watery matrix consisting largely of plant remains occurred deeper; and hard soil was not reached anywhere at a depth of 20 feet. Succession has undoubtedly been hastened by drainage and clearing of the surrounding area.—*J. E. Weaver.*

## FLORISTICS

5753. ALLEN, W. E. *Observations on surface distribution of marine diatoms between San Diego and Seattle.* *Ecology* 3: 140-145. *1 fig.* 1922.—Counts of diatoms by a modified Sedgwick-Rafter method estimated per liter of sample showed that between 13 and 33 species of diatoms are found along the coast region indicated in the title. These counts were made in 2 series by different observers on surface dippings made aboard steamers plying along the Pacific coast. The two genera most abundantly collected by both observers are *Chaetoceras* and *Nitzschia*, which occurred in nearly all samples taken. These observations raise a series of problems concerning the causes of the distribution of these diatoms and also show that apparently the northern waters of this region are more productive and that there is great fluctuation in the abundance of these organisms, both as to place and season. Certain species are also very generally distributed over large areas.—*H. H. M. Bowman.*

5754. LEWIS, F. Notes on a visit to Kunadiyaparawita Mountain, Ceylon. Jour. Linn. Soc. Bot. London 45: 143-153. 1 fig. 1920.—“The influence upon plant distribution of very special environment is discussed.” The mountain is remarkable for its “abnormal climatic conditions and its physical surroundings.” It rises abruptly to 5186 feet and is surrounded by high forest. The summit forms a sort of elevated island in a sea of forest, standing in the path of the southwest monsoon. It is, however, protected from the north-east monsoon. Wind velocity and rainfall are very high. The vegetation of this “island” constitutes a “wet-zone flora” which is remarkable for the high proportion of Ceylon endemics. The base of the mountain, however, has many non-endemic forms. The altitudinal distribution of many species is much more restricted than on other Ceylon mountains. This limited altitudinal range may be due to the steepness of the slopes and the consequent difficulty of obtaining foothold. With steepness of slope “the proportion of successful fruits would become less and less.” “Their method of reaching the summit must probably have been along the narrow wedge of forest that connects the base with the top; but while that assumption may be admitted, it is difficult to realize that the ultimate result corresponds to forms occurring at corresponding altitudes entirely separated by stupendous chasms of unbridged space.” A catalogue of plants collected on the mountain top is appended.—A. J. Eames.

5755. LYONS, A. B. Conspicuous tropical plants. (Reprint.) Amer. Bot. 30: 64-67. 1924.

5756. PASCHER, A. Ueber das regionale Auftreten roter Organismen in Süßwasserseen. [The regional occurrence of red organisms in fresh water lakes.] Bot. Archiv 3: 311-314. 1923.—If in strata of increased depth one examines the shore algae of an alpine lake one finds a pronounced regional grouping in which the Chlorophyceae decrease qualitatively and quantitatively until finally the zone at 7-12 m. is characterized by diatoms and blue-green algae together with flagellates. With decrease in the Chlorophyceae there is also an increase of red forms, reddish organisms the color of which changes from a red-spotted olive green through pale rose, lilac and Bordeaux-red, to deep red. Reddish to red blue-algae of all families are found, e.g., a reddish to red *Aphanocapsa*-like form belonging to the Chroococaceae, lilac to red *Gloeothea* species, Oscillatorias, etc.—William Seifriz.

5757. RYDBERG, PER AXEL. Phytogeographical notes on the Rocky Mountain region—X. Grasslands and other open formations of the montane zone of the southern Rockies. Bull. Torrey Bot. Club 48: 315-326. 1921.—Aquatic formations, sedge bogs, springy places, sandy river banks, alluvial river banks, meadows, salt and alkali meadows, dry valleys and benchlands, grassy hillsides, hog-backs and dry ridges, sand hills and sand-hill draws, and rock slides are treated; and for each formation are given the characteristic species, which are divided for the most part into 3 lists: eastern or transcontinental, western, and endemic.—P. A. Munz.

5758. WILLIAMSON H. B. Excursion to Brisbane Ranges. Victoria Nat. 40: 168-169. 1923.—Plants of the district are discussed.—Wm. Randolph Taylor.

## FORESTRY

W. N. SPARHAWK, *Editor*

(See also in this issue Entries 5696, 5705, 5724, 5729, 5730, 5752, 6015, 6104, 6115, 6310)

5759. ANONYMOUS. A notable report on forest taxation. Amer. Forest. 28: 667. 1922.—This is an editorial on Professor Fairchild's report on forest taxation. [See Bot. Absts. 13, Entry 5782.]—Chas. H. Otis.

5760. ANONYMOUS. Annual return of statistics relating to forest administration in British India for the year 1921-22. 31 p. Calcutta, 1923.—This is a series of 19 statements summarizing the work of the Forest Department. The forest area under control of the Department is 249,504 square miles, 22.7% of the total land area of British India. Details are given concerning progress of surveys, construction work, law enforcement, planting, fire protection, output of timber, receipts and expenditures.—L. S. Gill.



5761. ANONYMOUS. **Incendies forestiers 1922.** [Forest fires in 1922.] Bull. Soc. Centrale Forest. Belgique 30: 315-317. 1923.—This is a summary of the 1922 fire season in Belgium showing the acreage burned over, its ownership, the damage, causes of fires, and their distribution by months.—*H. T. Gisborne.*

5762. ANONYMOUS. **L'industrie forestiere en Roumanie.** [The forest industry of Roumania.] Bull. Soc. Centrale Forest. Belgique 30: 259-262. 1923.—(Extract from a report of the Belgian Legation at Bucarest.) The forests of Roumania cover about 7,500,000 hectares, or about  $\frac{1}{4}$  of the country. About  $\frac{1}{2}$  is privately owned. The principal species, division of the forest by provinces, and the principal uses of wood are given. Development is hindered by lack of transportation. Galatz is said to be the principal wood market of the Orient. The annual cut is fixed at about  $1\frac{1}{2}$  cubic m. per hectare or  $10\frac{1}{2}$  million cubic m. for the country. About 30-35% of this is surplus above local needs and can be exported. All publicly owned forests are handled according to the "Forest Code."—*H. T. Gisborne.*

5763. ANONYMOUS. **Planting trees by mechanical means.** A new device that saves time and loss. South African Jour. Indust. 7: 110. 4 fig. 1924.—The "Duivel" tree-planter takes up a young tree from the nursery with a cylindrical block of soil around its roots as much as 9 inches deep and 9 inches in diameter, and plants the whole in the position which the tree is to occupy permanently. The roots are thus left undisturbed and the tree suffers nothing from its change of position.—*L. J. Goldblatt.*

5764. ANONYMOUS. **Progress report of the forest administration in the province of Assam for the year 1922-23.** 13 p. Shillong, 1923.—Forest reserves increased by 17 square miles during the year. Enumeration surveys showed that the evergreen forests in general contain much less valuable timber than had been supposed. Details are given regarding road, trail, and railroad construction, protection, law enforcement, revenues, and personnel, while an appendix gives detailed tabulation of operations for the year.—*Willis Wagener.*

5765. ANONYMOUS. **The British Empire forestry conference.** Amer. Forest. 29: 534, 566. 1923.

5766. ANONYMOUS. **The hundred and first report of the Commissioners of His Majesty's woods, forests and land revenues.** 43 p. London, 1923.—On March 31, 1923, the British crown forests totaled about 72,200 acres.—*Willis Wagener.*

5767. ANONYMOUS. **The toll we pay.** Amer. Forest. 29: 458. 1923.—A table shows the number of forest fires, amount of damage, and area burned for 9 regions of the U. S. A.—*Chas. H. Otis.*

5768. ANONYMOUS. **Visite de l'Arboretum de Tervueren.** [A visit to the Arboretum of Tervueren.] Bull. Trimest. Soc. Forest. de Franche-Comté et des Provinces de l'Est 15: 139-142. 1923.—This arboretum was established in 1902 and the plantations are divided into 2 groups. The 1st represents the principal forest types of the temperate regions of North America and the 2nd those of Europe, Asia, and western Africa. Lists of species growing in the regional sub-groups of North America are given. The Alaskan group has 2 species, the British Columbian 5, Cascades of Washington 11, Oregon 9, California 15, Ohio 18, Alleghenies 18, and Pennsylvania 17. Douglas fir has made remarkable growth.—*J. Kittredge, Jr.*

5769. ALVIELLA, FELIX G. D'. **Le XIeme Congres International d'Agriculture.** [The Eleventh International Congress of Agriculture.] Bull. Soc. Centrale Forest. Belgique 30: 285-302. 1923.—A general outline is given of the work of the full Congress, held at Paris in May, 1922, followed by more detailed references to the Section on Silviculture. The program for this Section consisted of: I. The forest and the war. The situation as a whole, and methods of reconstruction. II. Forest fires. Protection measures. Insurance. III. Chemical utilization of wood. Cellulose, carbonization, distillation, derived products. IV. Tree diseases.—The systematic damage to the State and town forests is illustrated and corrective measures are prescribed. Quotations deal with the amount of overcutting during the war, the forest policy of France before and after the war, and the effect upon future production. Overcutting for the use of the Allied armies was not as serious as has been thought.—*H. T. Gisborne.*

5770. BARCLAY, G. A. **Tree-planting on prairie farms.** Amer. Forest. 29: 532-534. 5 fig. 1923.

5771. BODEN. Die Anbauversuche mit ausländischen Holzarten im akademischen Lehrrevier Freienwalde a. O. in den Jahren 1883/1921. [Culture experiments with exotic tree species. 1883-1921.] Zeitschr. Forst.- u. Jagdw. 55: 74-90. 1923.—Plantations of 27 coniferous and 20 hardwood species, mainly American, were established between 1881 and 1896. All species were started in nurseries on Class 2 pine soils, and most of the young trees were planted out as 2-year seedlings, or 4-5 year transplants. Of the conifers, Douglas fir has shown remarkable development, and *Pinus banksiana* appears to have value for poor pine soils in north Germany. In general, exotic species find soil and atmospheric conditions unfavorable.—*J. Roeser.*

5772. CLAUDOT. La location des chasses dans les forêts communales. [Regulation of hunting in the communal forests.] Bull. Trimest. Soc. Forest. de Franche-Comté et des Provinces de l'Est 15: 173-177. 1923.—Suggestions are made for the control of hunting in the communal forests.—*J. Kittredge, Jr.*

5773. COLLEAUX, H. Quelles sont les essences feuillues précieuses à cultiver en mélange avec le hêtre? Moyens culturaux à mettre en oeuvre pour reconstituer la futaie mélangée. [What are the valuable deciduous species to cultivate in mixture with beech?] Bull. Trimest. Soc. Forest. de Franche-Comté et des Provinces de l'Est 15: 152-164. 1923.—Beech, by reason of its tolerance, rapid growth, and easy regeneration, tends to eliminate less tolerant and more valuable species from the stands. Probably the only remedy is to plant the valuable species in groups in natural or artificial openings. Oak, larch, elm, and ash can be introduced in this way. Maple and poplar are also desirable species to introduce. Once introduced, ash and maple will reproduce themselves naturally if openings are made in the cover. Natural openings should be enlarged and made regular by progressive cuttings in concentric zones. The minimum size of the openings depends on the height of the stands, the exposure, the density of the neighboring stand, the form and orientation of the opening, the rotation, and the species to be introduced. Oak, being most intolerant, may be located in the center of a large opening surrounded concentrically by ash and maple. The openings should be roughly circular and 7-10 ares in area. For oak and ash, spacing of 1m. is suggested.—*J. Kittredge, Jr.*

5774. COOK, H. O. The Fitchburg town forest. Amer. Forest. 29: 592-593. 5 fig. 1923.

5775. COVENTRY, B. O. Progress report of forest administration in the Jammu and Kashmir State for the year 1921-22. 2 + 26 + 67 p. Lahore, 1923.—This is a detailed summary of the work in progress and the ends accomplished by the Forest Department. Considerable improvement thinning is carried on, though most cutting is on a selection basis. Ash, walnut, and eucalyptus are being tried. Natural regeneration of deodar and pine is generally fairly satisfactory, while that of fir and chir pine is poor. Fire protection and fiscal matters are also discussed.—*L. S. Gill.*

5776. DELEVOY, G. La protection des forêts coloniales. [Protection of the colonial forests.] Bull. Trimest. Soc. Forest. de Franche-Comté et des Provinces de l'Est 15: 164-165. 1923.—The French colonial forests in Africa are important resources which are now deteriorating as the result of fires and abuse by the inhabitants. They reestablish themselves only slowly and are often replaced by valueless growth. A definite policy for their protection should be adopted.—*J. Kittredge, Jr.*

5777. DENGLE, A. Aufgaben und Wege der wissenschaftlichen Begründung des Waldbaus. [Problems and methods in the scientific establishment of silviculture.] Zeitschr. Forst.-u. Jagdw. 55: 66-74. 1923.—The 3 essentials for establishing silviculture on a scientific basis are: a complete historical record for each forest stand, comprehensive and thorough-going observations of the life phenomena of forest trees and stands, and experimentation, both under controlled conditions in the laboratory, and under natural conditions in the forest.—*J. Roeser.*

5778. DRUMAU, L. Forêts, chasse, et pêche, au point de vue économique en Belgique. [Forests, hunting, and fishing, from the economic point of view in Belgium.] Bull. Soc. Centrale Forest. de Belgique 30: 249-256. 1923.—The article is a concise statement of: The Belgian Forest Service organization; the assistance in forestry furnished by this service; the extent and subdivision of the forests of Belgium; forest production, imports, exports, and customs duties; and the financial value of hunting and fishing in Belgium.—*H. T. Gisborne.*



5779. E., R. **En Belgique rédimee.** [In redeemed Belgium.] Bull. Soc. Centrale Forest. Belgique 30: 257-259. 1923.—This is a short note on the forests in certain cantons restored to Belgium by the Treaty of Versailles. Spruce managed on a clear cutting system with an 80-year rotation gave 500-600 cubic m. per hectare. A young stand, aged 35 years, has 1800 stems per hectare, with an average diameter of 18 cm. and a height of  $16\frac{1}{2}$  m. Certain choice timber brought as much as 270 francs per cubic m. in the log.—*H. T. Gisborne.*

5780. EBERBACH. **Forsteinrichtung ohne Umtriebszeit.** [Forest regulation without rotation.] Zeitschr. Forst.- u. Jagdw. 55: 90-113. 1923.—Forest regulation should be subordinate to forest management, and attention should be directed to individual trees rather than to the stand. The plan of management for the community forest of Bohlingen is described; it is essentially the continuous forest system.—*J. Roesser.*

5781. FABRICIUS. [Rev. of: (1) SCHOTTE, GUNNAR. **Om snöbrottsfaran vid mycket starka gallringar.** (Danger of snow breakage with heavy thinnings.) Meddel. Statens Skogsförsöksanst. 19: 493-514. 4 fig. 1922. (2) MATTSOON-MARN, L. **Snötryckssakador a ungtall.** (Snow damage to young pines.) Meddel. Statens Skogsförsöksanst. 19: 517-528. 1922.] Forstwiss. Centralbl. 45: 355-357. 1923.—The results of both studies, while interesting from a purely scientific viewpoint, have no practical application.—*W. N. Sparhawk.*

5782. [FAIRCHILD, F. R.]. **Forest taxation.** Amer. Forest. 28: 655-660. 1922.—This is a complete report of the Committee on Forest Taxation of the National Tax Association, covering various topics bearing on past, present, and future taxation. [See also Bot. Absts. 13, Entry 5759.]—*Chas. H. Otis.*

5783. FROTHINGHAM, E. H. **Forest problems of Georgia's hardwood region.** Amer. Forest. 28: 673-677. 4 fig. 1922.—The 1st step in forestry in Georgia's mountain hardwoods is largely economic and legislative, to provide a growing stock. The 2nd step is to regulate the yield of this growing stock in unit areas, coupled with more intensive silviculture than can be practiced under present limitations.—*Chas. H. Otis.*

5784. GRAVES, H. S. **Public forests and private forestry.** Amer. Forest. 29: 613-615. 1923.

5785. GRAVES, H. S. **The farm and the forest.** Amer. Forest. 29: 453-457. 7 fig. 1923.—This article bears on the importance of woodlots to the farmer and to local industries.—*Chas. H. Otis.*

5786. HENKEL, J. S. **Forestry in Southern Rhodesia. The propagation of eucalypts.** Rhodesia Agric. Jour. 20: 565-569. 1923.—Several species of eucalypts readily adapt themselves to the climate of Southern Rhodesia. Because of the small size of the seed of most species, great care is required to insure success in raising plants.—*L. J. Goldblatt.*

5787. HENKEL, J. S. **Preservative treatment of indigenous timbers.** Rhodesia Agric. Jour. 21: 61-63. 1924.—In Southern Rhodesia termites, wood boring insects, and fungi destroy a considerable proportion of the timbers used for such purposes as building and fencing. An open tank method of preservative treatment is described.—*L. J. Goldblatt.*

5788. HILL. **In welchen Beziehungen empfiehlt sich eine Abänderung des Waldkulturgesetzes für den Kreis Wittgenstein vom 1 Juni, 1854.** [Under what conditions is a change in the forest-culture ordinance of June 1, 1854, for the district of Wittgenstein, desirable.] Zeitschr. Forst.- u. Jagdw. 55: 234-241. 1923.

5789. JOBEZ, H. **Forêt de Soignes et jardinage.** [The forest of Soignes and the selection system.] Bull. Trimest. Soc. Forest. de Franche-Comté et des Provinces de l'Est 15: 166-168. 1923.—Can the forest of Soignes, now managed under a system of clear cutting, planting of beech, and cleanings to release the beech, be converted into a selection forest? This could be done by enlarging natural openings over entire blocks, thinning to end the competition of the young trees, and allowing wood production to be concentrated on the best individuals. This would increase the annual growth from an average of 7-8 to 30-40 cubic m. to the hectare.—*J. Kittredge, Jr.*

5790. JUDD, C. S. **Reforesting desert islands.** Amer. Forest. 29: 555-556. 3 fig. 1923.—Experiments on Laysan and other islands are described.—*Chas. H. Otis.*

5791. KAUFMANN, J. E. **Tree planting in East Griqualand.** Jour. Dept. Agric. Union South Africa 7: 317-324. 5 fig. 1923.—The characteristics of certain trees (chiefly *Populus* spp.) are discussed and cultural methods described.—*L. J. Goldblatt.*

5792. KEENE, F. P. War on the pine beetle. How men and money are fighting to save our western pine from the beetle hordes. Amer. Forest. 29: 689-694. 9 fig. 1923.

5793. KIRCHER, J. C. Lumber in Brazil. Amer. Forest. 29: 520-522, 570. 4 fig. 1923.—A brief résumé is given of the qualities and uses of lumber in Brazil.—*Chas. H. Otis.*

5794. LAMB, G. N. A pure stand of sassafras. Amer. Forest. 29: 474. 1 fig. 1923.

5795. MARTIN. Ein Dauerwald in Hessen. [A continuous forest in Hesse.] Zeitschr. Forst.- u. Jagdw. 55: 129-141. 1923.—The history and management of the Trottenwald, which has existed as a managed forest for over 200 years, are described, and its performance is compared with that of the ordinary clear-cutting systems in the high forest. Pine (occurring naturally, which is not the case in the greater part of western Germany), beech, and oak are the principal species. The yield of German forests may be increased under the continuous system by keeping the soil constantly in good condition, primarily through the introduction and retention of beech in mixture; by giving more attention to the stand left after cutting than has been the case in the past; and by nursing the better stems and removing the poorer ones. Value increment should be considered more important than mere volume increment.—*J. Roesser.*

5796. METCALF, W. Forestry among the giants. Amer. Forest. 28: 643-654. 11 fig. 1922.—Early logging methods, maximum sizes and yields per acre in the redwood forests (*Sequoia sempervirens*) are discussed. While there probably have been trees over 25 feet in diameter and about 375 feet in height, trees over 16 feet in diameter are now scarce. What is said to be the largest tree in Sonoma County was 357 feet high and 20 feet in diameter 20 years ago and is still alive except for the upper half of the crown. Over a million board feet was recently cut from 1 acre near Dyarville. Individual trees have scaled 118,000-160,000 board feet. With about 70 billion board feet of virgin redwood on some 900,000 acres, it has been estimated that cutting can be continued for about 75 years. Redwood sprouts consistently and profusely from the stump, and probably 80% of the trees in virgin stands originated in this manner. While sprouts restock  $\frac{1}{3}$ - $\frac{1}{2}$  of each acre after logging, to obtain a fully stocked stand it is necessary to leave seed trees or to plant seedlings. Planting seems to be preferable.—*Chas. H. Otis.*

5797. MILLER, R. B., AND GEO. D. FULLER. Forest conditions in Alexander County, Illinois. Trans. Acad. Sci. 14: 92-108. 11 fig., 1 map. 1921.—This preliminary survey covered 82 sq. miles in the Jonesboro quadrangle. One-third of the area is in the flood plains of the Mississippi and Cache Rivers, ranging in elevation from 332-344 feet, while the hills at 2-3 points reach 800 feet above sea level. The completely dissected upland with its brown sandy silt loam sod is in striking topographical contrast to the level, poorly drained flood plain, with its gray to black, heavy clay loam soil. The forest ranges from one in which black oak (*Quercus velutina*) dominates on the hill top, through a beech-maple forest on the sheltered slopes, to a cypress swamp on the flood plain. Most of the forest has been partly or completely cut over in the last 40 years. At present veneer wood, ties, and posts are the chief timber products. Most of the area should be devoted to timber production rather than to farm crops.—*W. G. McGinnies.*

5798. PEARSON, R. S. Summary of results of treated and untreated experimental sleepers laid in the various railway systems of India, brought up to date. Forest Bull. 53. 28 p. Delhi, 1923.—Powellising and the full cell method of treatment with creosote or a mixture of creosote and crude oil have given equally good results. Records of untreated ties are added for comparison. Six to 8 native species of timber have proved durable for ties, among them *Pinus excelsa*, *Terminalia tomentosa* and 2 species of *Dipterocarpus*. Creosoted Douglas fir ties from the U. S. A. have given only fair service.—*Willis Wagener.*

5799. PEIRSON, H. B. Larch in Maine threatened by insect depredation. Amer. Forest. 28: 666. 1922.

5800. PERRIN. Sur l'introduction du sapin pectiné aux basses altitudes. [Introduction of European fir at low altitudes.] Bull. Trimest. Soc. Forest. Franche-Comté et Provinces de l'Est 15: 72-78. 1923.—*Abies pectinata* is comparatively exacting in its requirements, but if these are satisfied it establishes itself firmly, grows rapidly, reproduces naturally, and forms a rich and permanent forest. In its natural range it occupies a zone above that of the vineyards and oak, corresponding quite closely to that of beech. The climatic conditions of this



zone are: mean annual temperature at least 5°C.; season of vegetative rest more than 3 months without mean monthly temperatures below -5°C.; spring without too heavy or too late frost; summer with a mean temperature of at least 15°C. and somewhat humid; and annual precipitation, 1 m., of which  $\frac{3}{5}$  should fall in the growing season. *A. pectinata* grows well, however, at points outside its natural range where the rainfall is less, provided the atmospheric moisture is high with resulting fogs and mists. It is not exacting as to chemical composition of the soil provided the latter is somewhat fresh, rich, and sufficiently coarse in texture to allow root penetration. The preference of seedlings for shade may be due to the protection which the cover gives against spring frosts. *Sambucus racemosa* and *Prenanthes purpurea* are indicators of sites on which this fir is most likely to succeed. It may be planted successfully at low elevations in appropriate soils and climates. It may be introduced in mixture with hardwoods either in groups several years before exploitation of the hardwoods, or by planting large stock after logging. Alternate rows of birch or alder spaced 1-3 m. apart, planted at the same time as, or earlier than the fir, serve effectively to protect it from frost and sun, do not interfere with its growth, and can be removed gradually as the fir develops. In planting fir, seed of local origin should be chosen, as it is best adapted to the environment.—*J. Kittredge, Jr.*

5801. QUAIRIÈRE, C. Expérience internationale sur l'origine du pin sylvestre. [International experiments concerning the source of seed of Scotch pine.] Bull. Trimest. Soc. Forest. de Franche-Comté et des Provinces de l'Est 15: 142-151. 1923.—In accordance with the decision of the international congress of forest experiment stations of 1906, the different stations in Europe participated in a study of the source of seed of Scotch pine (*Pinus sylvestris*). In the spring of 1907, the Belgian experimental service planted seed from Scotland, France, eastern Prussia, Belgium, Bavaria, Russia (Riga), eastern Russia, Bulgaria, Switzerland, and northern and western Hungary. Experimental areas were established in 4 different localities. Based on the dimensions of the average tree, the plants from Belgian seed gave the best results in 5 out of 6 trials. Bavarian seed was next best. Classified by volume, Belgian seed gave the best results 4 out of 6 times; eastern Prussian, once; and western Prussian, once. The conclusion is that in Belgium, Scotch pine from Belgian seed gives best results most regularly.—*J. Kittredge, Jr.*

5802. QUAIRIÈRE, C. Le bois domanial d'Op't Stort. [The public forest of Op and Stort.] Bull. Soc. Centrale Forest. Belgique 30: 302-314. 1923.—This forest of 183 hectares consists of plantations made for the purpose of experimenting with various species in both pure and mixed stands.—*H. T. Gisborne.*

5803. ROSS, C. G. With Harding in Alaska. Amer. Forest. 29: 579-582. 4 fig. 1923.—The Alaskan national forests, embracing 20 million acres, contain 80 billion board feet of timber, chiefly spruce and hemlock, nearly all within 2-3 miles of tidewater. Twelve sawmills and 2 shingle mills are now operating. The forests are estimated to contain 100 million cords of timber suitable for paper-making, and can furnish a perpetual yield sufficient to make 1½ million tons of print paper a year, or 60% of the present consumption of such paper in the U. S. A. Forty-four water power sites have been located, capable of producing 400,000 horsepower.—*Chas. H. Otis.*

5804. ROSSEELS, EG. Agriculture et silviculture. [Agriculture and silviculture.] Bull. Soc. Centrale Forest. Belgique 30: 243-248. 1923.—An eminent Belgian agronomist has proposed that about 140,000 hectares of forest be cleared and planted to wheat in order to help supply the wheat demand of Belgium. The present article is the forester's reply.—*H. T. Gisborne.*

5805. SCHAEFFER, A. Futaie jardinée feuillue. [Deciduous selection high-forest.] Bull. Trimest. Soc. Forest. de Franche-Comté et des Provinces de l'Est 15: 177-179. 1923.—In the mixed deciduous high-forests of eastern France only frequent cuttings to release them can save the oaks. Natural openings produced by windthrow, insects, or natural death should be supplemented by artificial openings or well-cuttings made at frequent intervals. In converting coppice-under-standards to high-forest, the seedlings which establish themselves in openings made by the removal of the old standards are released by cuttings at short intervals. These groups of young growth of different ages gradually develop and constitute a selection forest of small groups.—*J. Kittredge, Jr.*

5806. SCHAEFFER, A. *Martelage en délivrance dans les taillis sous futaie.* [Marking trees to be cut in coppice-under-standards.] Bull. Trimest. Soc. Forest. de Franche-Comté et des Provinces de l'Est 15: 169-173. 1923.—Marking may be done as follows: First make an inventory of all trees 60 cm. in circumference and over, at the same time marking obviously defective trees; later the marking officer marks the trees to be cut and scribes the coppice stems to be reserved.—*J. Kittredge, Jr.*

5807. SCHARF. Zu "Altersbestimmung der Riesenbäume." [Age determination of giant trees.] Zeitschr. Forst.- u. Jagdw. 55: 247-248. 1923.—The "thick-oak" (*Quercus pedunculata*), near Volkenroda, Thuringia, is popularly believed to be 1200 years old. Beginning in 1821, when its girth at 1.7 m. was 565 cm., the annual girth increment has been: 1821-1831, 12.5 cm.; 1831-1841, 0.9 cm.; 1841-1851, 2.4 cm.; 1851-1881, 2.1 cm.; 1881-1901, 1.2 cm.; and 1901-1921, 1.5 cm. The large increase in the 1st period was due to heavy bark formation. The increment for the past 30 years indicates that the tree is about 500 years old.—*J. Roesser.*

5808. SPARHAWK, W. N. *The forests of the world.* Amer. Forest. 29: 583-588. 6 fig. 1923.—The timber resources of the world and America's position in relation to foreign forests are briefly summarized.—*Chas. H. Otis.*

5809. STEBBING, E. P. *The forests of north Russia and their economic significance.* Jour. Roy. Soc. of Arts 71: 416-429. 1923.

5810. SUDWORTH, G. B. *Is there a frost-resistant eucalypt?* Amer. Forest. 29: 464-466. 7 fig. 1923.—The successful culture of *Eucalyptus coriacea alpina*, growing in Victoria and New South Wales at elevations of 4,500-5,500 feet above sea-level, and standing in 3-4 feet of snow in winter, is considered possible in the colder parts of the United States.—*Chas. H. Otis.*

5811. WEISS, H. F. *The future war for wood.* Amer. Forest. 29: 667-669, 679. 3 fig. 1923.

5812. WHITMORE, E. W. *Two states fight forest devastation.* Amer. Forest. 29: 496-500. 7 fig. 1923.—The states discussed are New York and New Jersey.—*Chas. H. Otis.*

5813. WOLFF, MAX, UND ANTON KRAUSSE. *Eine eigentümliche Beschädigung des Mai-triebes von Pinus silvestris durch die Julistürme im Jahre 1922.* [The peculiar injury to new shoots of *Pinus silvestris* by the July storms of 1922.] Zeitschr. Forst.- u. Jagdw. 55: 112-115. 3 fig. 1923.—The long-continuing storms and exceptionally heavy rains occurring over North Germany in July 1922 caused a considerable loss of young needles on *Pinus silvestris*, due to the switching about or rubbing of shoots against each other. No such damage was produced in plantations of *P. banksiana*.—*J. Roesser.*

5814. WOODS, J. B. *The problem of the southern pine lands.* Amer. Forest. 29: 537-540. 6 fig. 1923.—Forestry in a limited measure, upon non-agricultural lands, is inevitable in the South; but to prevent a serious business depression following the decline of lumbering, some immediate use must be made of the medium quality cut-over pine lands, constituting probably  $\frac{2}{3}$  of the total pine acreage, which are capable of producing farm crops. They may be sold to settlers or utilized for growing crops of timber.—*Chas. H. Otis.*

## GENETICS

ORLAND E. WHITE, *Editor*

(See also in this issue Entries 5683, 5720, 6019, 6024, 6070, 6193, 6230, 6232)

5815. ABBOTT, CHARLES L. *Tree of life or the evolution of all living things, from bacteria to man.* Publ. by author: St. Paul, Minn., 1923.—This is a wall chart showing in diagrammatic form the relation of plants and animals on the evolutionary tree.—*Orland E. White.*

5816. ANDERSON, EDGAR. *Studies on self-sterility. VI. The genetic basis of cross-sterility in Nicotiana.* Genetics 9: 13-40. 1 fig. 1924.—It had been found previously that the self-sterile hybrids between the self-sterile species *N. alata* and *N. forgetiana* formed populations each consisting of a relatively small number of classes, the members of which were mutually cross-sterile within their class, but cross-fertile with all the members of any other class. The immediate cause of the sterility was delayed growth of the pollen-tubes. In the present investigation about 40 families were studied, and all showed the division into intra-sterile and inter-fertile classes. Only 2 small lots of plants from open-pollinated seeds



of the parental species were tested. Most of the crosses were made between descendants of crosses between the 2 species. In all, 24 classes were certainly distinguished. In 24 of the crosses, only 2 classes were found; while, in 1 cross, 4 classes appeared. In 2 selfings there were 2 classes, while 1 selfing showed only 1 class. The total numbers in the 2 classes were in the ratio 1:1 in those sibships which had the same 2 classes; as, a and b, b and c, or a and c. The details of the inheritance are yet to be worked out.—*John Belling*.

5817. BATESON, W. **Note on the nature of plant chimeras.** *Studia Mendeliana*. 9-12. 1 pl. Typos: Brünn, Czechoslovakia, 1923.—The author defines a plant chimera as a mosaic of 2 or more parts which behave genetically as if they were distinct organisms. He discusses periclinal and sectorial chimeras; inheritance is regular in the former and irregular in the latter. But if the sectorial chimera is finely divided, it may breed with as much constancy as if it were an individual genetic whole. "For a parti-colored flower to breed true like the Dutch Rabbit, the parti-coloring must be arranged in a definite and consistent pattern, as that of a picotee carnation is." In the intimate mosaic the gametes transmitting the mosaicism must be regarded themselves as mosaics containing less than the whole of either factor. The author refers to Noack's paper (*Pringsheim's Jahrb. Wiss. Bot.* 61: 459. 1923) on microscopical examination of the process of growth. He mentions a periclinal chimera (white over green leaves) in Zonal Pelargoniums from which he obtained green shoots that when propagated reverted again to the parental type. He assumes that even in the green core there must have been as "island" of albino tissue which eventually came to the surface.—*M. A. Kelaney*.

5818. BAUER, JULIUS. **Vorlesungen über allgemeine Konstitutions- und Vererbungslehre.** [Lectures on genetics and the general constitution.] 2nd ed., 218 p., 55 fig. Julius Springer: Berlin, 1923.—The work is written especially for medical students and physicians. Chapter 1 considers the nature and implications of the pathology of the human constitution. In chapters 2-3, individual variability, its laws, measurability, origin, causes, etc., are discussed. The inheritance of acquired characters, mutation, etc., are treated in chapter 4, while chapter 5 deals with such subject matter as the statistical study of heredity, Galton's laws and the continuity of the germ plasm. Mendelism in its various aspects, as exemplified in human beings, forms the basis of chapters 6-7. The last 5 chapters are a treatment and discussion of the various aspects of the human constitution, special consideration being given to degeneration and abnormalities in their relation to inbreeding, selective processes, mutation, heredity, morphology, the nervous organization, the hormones and gland secretions, syphilis, susceptibility to such diseases as tuberculosis, heart trouble and cancer. The last of these chapters is devoted to the relation of constitutional make-up to race and society, and has an outline of the chief anthropological and constitutional characteristics to be considered.—*Orland E. White*.

5819. BENOIT, J. **Sur les variations quantitatives des tissus interstitiels glandulaire et non glandulaire dans le testicule des oiseaux à activité sexuelle périodique.** [Quantitative variations of interstitial glandular and non-glandular tissues in the testicles of birds of periodic sexual activity.] *Compt. Rend. Soc. Biol.* 88: 205-207. 1923.—Stieve's findings on the interstitial cells of the crow do not apply to another bird (Combassou). In the latter the interstitial tissue undergoes profound modification at the period of sexual activity. Calculations of relative amounts of various testis components are given for seasonal periods of sexual activity and repose. With sexual activity the cells become glandular and the tissue assumes the aspect of an endocrine gland increased in volume and weight. It is urged that Stieve is wrong in denying the elaboration of a sexual hormone by this tissue.—*Oscar Riddle*.

5820. BLACKBURN, KATHLEEN B. **Sex chromosomes in plants.** *Nature* 112: 687-688. 1 fig. 1923.—Incidental to an investigation of the cytology of dioecious plants, the author studied the genus *Lychnis*. Strasburger examined one species, *Melandrium rubrum* Garcke (*Lychnis dioica* L.) finding somatic cells, in both sexes, to contain 12 pairs of chromosomes. At the time of heterotypic division, one pair of chromosomes was much larger than the others, but the individual members of this pair were of equal size; there was, therefore, no difference to indicate the possibility of the formation of 2 types of microspore.—Similarly, in *Lychnis alba* Mill. the author finds 24 somatic chromosomes of which 2 are larger than the rest. In

the female, at the time of reduction division, these 2 appear similar, but in the male these 2 large chromosomes differ both in size and shape. Since *L. alba* is so closely related to *L. dioica*, in which Shull has demonstrated sex-linked characters with the male heterozygous for sex, the author thinks it probable that *L. alba* is a definite case of an XY pair of chromosomes in the male with a corresponding XX in the female.—*Dorothy I. Neff*.

5821. BLARINGHEM, L. Note sur la biologie des rouilles et des charbons: IV. Formes des rouilles d'automne sur les hybrides de blés à végétation prolongée. [Biological notes on rusts and smuts: IV. Rust forms in fall, on long growing hybrid wheats.] Rev. Path. Vég. et Entomol. Agric. 10: 308-313. 1923.—Teleutospores of *Puccinia graminis* are abundant in fall on naturally maturing stems of fertile wheat-hybrids, or on dried stems left standing after the death of sterile hybrids; only uredospores occur on tissues which are still green at that time. Homogenous lots of hybrids react in the same manner towards *Puccinia graminis*. But, comparing the sterile hybrid *Monococcum* × (*Monococcum* × *durum*) with the reverse (*Monococcum* × *durum*) × *Monococcum* shows that the former, which matures first, yields many teleutospore sori, while the latter, which still remains green at the end of October, shows only uredospore sori at that time.—In the same field where *Triticum monococcum* was never observed with rust, the hybrids, *Triticum dicoccoides* × *Monococcum*, and even (*Monococcum* × *Monococcum*) × *durum* proved susceptible to *P. graminis*.—*J. Dufrenoy*.

5822. BOEFF, F. Deux cas de fécondation croisée spontanée chez le blé dur (*Triticum durum*) et le blé tendre (*Triticum vulgare*). [Two cases of natural crossing in durum and common wheat.] Dir. Gen. Agric. Com. et Colon. Bull. 110. 447-462. 1922.—In the progeny of 2 heads of Huguenot durum wheat received from the Transvaal there appeared in the 2nd year grown in Tunis (crop of 1920) certain plants which later were found to be natural hybrids with other wheats grown in the experimental field. Intensive studies of the F<sub>2</sub> generation plants were made, the detailed classification revealing 119 different combinations of distinct type. An atypical head found in 1920 in a plot of common wheat (*T. vulgare*), an Australian variety assigned No. 49, segregated the next year in a manner indicating that it was a natural hybrid. The 36 plants obtained were classified according to head, grain, and straw characters into 17 distinct groups.—*C. E. Leighly*.

5823. BRIERLEY, W. B. On a form of *Botrytis cinerea*, with colorless sclerotia. Phil. Trans. Roy. Soc. London B 210: 83-114. 1 pl., 1 fig. 1920.—A diseased specimen of *Crassula perforata* was examined and the causal pathogen identified as *Botrytis cinerea*. Cultures were made from which single spore strains were obtained which, on accepted criteria, were pure lines. More than a month later in one of the tubes a sclerotia arose spontaneously without any evident relation to external conditions or stimuli, which did not turn black like the rest but remained colorless. This was isolated and found to breed true for this colorless character, being apparently differentiated from its parent in respect to the single character of color only; the albinism appears to be associated with the absence of a factor for chromogen. The change has occurred only once and has given rise to a form unknown in nature and perfectly constant under all conditions. It would at first seem possible to place only 1 interpretation on these facts, that of mutation. An examination, however, of mutations in fungi and bacteria recorded by other investigators suggests that such a conclusion is not compulsory. There is the possibility of nuclear contaminations and cytoplasmic contaminations. In *Botrytis cinerea* there is no sexual process but the possibility of genetic contamination is brought about by the occurrence of hyphal anastomoses. The author believes that "In the extremely rare chance of a fertile conidiophore arising from a cell contaminated by the nuclei or cytoplasm of a genotypically different individual lies the explanation of the colorless form of *Botrytis cinerea*".—*Dorothy I. Neff*.

5824. BROZEK, ARTUR. Příspěvek ku biologii a genetice plnokvětých rostlin. [The biology and genetics of the full blossomed plants.] Studia Mendeliana. 13-59, 1 pl. Typoss Brunn, Czechoslovakia, 1923. (English summary.)—This article deals with the genetic: of paracorolla in *Mimulus tigrinoides*. The paracorolla consists of a few narrow, petal-like excrescences growing from the inner surface of the corolla tube and covering the filaments. When the paracorolla is crossed with the normal flower form, the F<sub>1</sub> is normal and in F<sub>2</sub> 3 normal : 1 paracorolla or 15 normal : 1 paracorolla is obtained. A cross between 2



plants differing in petal spotting gave in  $F_1$  a mosaic of the parental patterns.—*J. L. Collins.*

5825. CASTLE, W. E. The relation of Mendelism to mutation and evolution. *Amer. Nat.* 57: 559-561. 1923.—“Mendel’s law, as Mendel understood it, involving dominance and segregation in 3:1 ratios,” applies to few and relatively unimportant characters which generally are character losses and inferior in natural survival value. In contrast, the differences involving characters valuable in animal breeding are usually “blending.” Fundamentally, however, these are probably Mendelian also, depending on multiple non-dominant pairs of genes of differing importance. As to the origin of the variations used in evolution, large de Vriesian mutations, being caused by aberrations of entire chromosomes, will not give an answer. Current theory seeks the answer in separate mutations of single genes, which occur with appreciable frequency, accompanied by a natural selection of the mutants. Such a condition is essentially Darwinian and opposed to the popular pure line doctrine. On this theory variation and evolution in a “blending character” must be gradual, as one after another gene is involved. Mutation then “will not be mutation except in name,” “Darwin was substantially right,” and “the mutationists have lost their case” except in name. Older characters, distinguishing species, etc., will then give blending inheritance in the crosses between such widely separated groups.—*H. J. Muller.*

5826. CLAUSEN, J. Increase of chromosome numbers in *Viola* experimentally induced by crossing. *Hereditas* 5: 29-32. 1 fig. 1924.—The species *Viola tricolor* L., with 13 pairs of chromosomes, and *V. arvensis* Murr., with 17 pairs of chromosomes, were crossed. The  $F_1$  plants should have 30 chromosomes. One  $F_1$  plant showed, however, a total of 47 chromosomes, instead of 30, in 1 of its pollen-mother-cells after the 1st division. In other pollen-mother-cells of the same plant, except 2, none of the chromosomes divided at the 1st division—the usual method in this hybrid. In the progeny of this  $F_1$  plant, 1 plant showed, in 1 pollen-mother-cell, 46 chromosomes, there being a segregation of 21 and 25 after the 1st division. In 2  $F_2$  plants from the progeny of another  $F_1$  plant, single pollen-mother-cells gave totals of 45 and 43 respectively after the 1st division, at the 2nd metaphase.—*John Belling.*

5827. CONNORS, C. H. Carnation breeding. *Ann. Rept. New Jersey Agric. Exp. Sta.* 43: 106-107. 1921-22 [1924].—This is a brief report of breeding work with carnations together with a list of seedlings under test.—*Wm. H. Martin.*

5828. CONNORS, C. H. Peach breeding—technical phases. *Ann. Rept. New Jersey Agric. Exp. Sta.* 43: 97-101. 1921-1922 [1924].—This is a brief report on the results of breeding experiments with peaches.—*Wm. H. Martin.*

5829. CUÉNOT, L. Génétique et adaptation. *Second Internat. Congr. Eugenics*, Vol. 1. *Eugenics, genetics and the family.* 29-58. 10 fig. Williams & Wilkins Co.: Baltimore, 1923.—With the Mendelian and mutation conceptions as a basis, the author discusses the problems of the inheritance of acquired characters and the origin of adaptations. Five different classes of acquired characters are considered: (1) mutilations; (2) effects of parasitic diseases producing general poisoning; (3) action of the great natural factors—light, temperature, humidity, salinity, nourishment; (4) effects of use and disuse; and (5) acquisitions of training and intellectual education. Until very recently, experimental work on the inheritance of acquired characters has given only negative or uncertain results. The recent work of Guyer and Smith on the inheritance of crystalline abnormalities, determined in the embryos by the injection of crystallo-toxic serum into pregnant mothers, if confirmed, will allow in a certain measure the acceptance of the inheritance of some acquired characters in the form of parallel induction. The medium produces, on the one hand, an effect more or less adaptable to certain tissues of the body, and on the other hand parallelly modifies the representative colloids (Mendelian factors) of the germ cells so that a cumulative effect active in successive generations is produced on the same general factor.—Adaptation and preadaptation: General adaptation necessary and sufficient for the animal to his medium (environment) is to be distinguished from special adaptation [conditions determined by the medium, which have not the stamp of necessity (webbed feet of aquatic vertebrates)]. Lamarck’s and Darwin’s theories are not concerned with the evolution of special adaptations (orthogenesis) or with general

adaptation. The theory of preadaptation can be formulated thus: Nothing can populate a medium but those species or individuals which before entering it show necessary and sufficient general adaptation; the medium acts as a filter, eliminating all but those forms having general adaptability, and suited to the medium from which they have come, as well as being suitably adapted to that which they enter, although the latter could notably differ from the former. This idea of preadaptation is in perfect agreement with the factorial and mutation conceptions. The undeniable adaptation of organisms to their surroundings is the result of happy coincidences, of a series of experiments allowing many errors and some successes. We recognize only the latter. All survivors are necessarily well adapted.—Coaptations: These are structures of very secondary usefulness, but of rare mechanical perfection, the genesis of which is hard to understand on 1 or the other of the theories of adaptation. Examples of such are the wing cases of the aquatic Hemiptera, the ovipositor of locusts, the musical organs of the Longicorns, etc. (reciprocal adaptations of independent parts). Coaptations are developed in the pupa or embryo before all possible use, by an independent development of the parts which later adjust themselves in a remarkably exact manner. Possibly coaptations originate by reciprocal pressure and molding, by obscure mutation, by evolution governed by utility. Selection seems insufficient to explain coaptations, especially those which though completely perfect, cannot play the role. A new factor, as yet unknown, seems to be a necessity—a factor that regulates mutation and is capable of directing it toward an end.—*L. Cuénot and Catherine S. Van Brunt.*

5830. CZELLITZER, ARTHUR. Wie vererbt sich Schielen? [How is squint-eye inherited?] Arch. Rass.- u. Gesellschaftsbiol. 14: 377–394. 7 fig. 1923.—From investigations among school children the author concludes that squinting is not caused by defective vision. There is no linkage between sex and squinting, although it was found slightly more frequently in females. From a study of family statistics it was found that hereditary squinting is conditioned by 2 recessive complementary genes, with probably a 3rd gene producing a different but similar type. Pedigree charts are given to illustrate the relation between squinting and certain nervous disorders, insanity and twitching of the eyes. One family is cited which indicated a linkage between squinting and twitching of the eyes. Evidence of other linkage relations was not found. The age of the parents had no influence upon the production of squint-eyed children.—*J. L. Collins.*

5831. DÜRKEN, BERNHARD. Allgemeine Abstammungslehre. Zugleich eine gemeinverständliche Kritik des Darwinismus und des Lamarckismus. [General treatise on the doctrine of descent. Also a popular criticism of Darwinism and Lamarckism.] 205 p., 38 fig. Gebrüder Borntraeger: Berlin, 1923.—This popular work discusses the theory of evolution from 2 general aspects: (1) The evidence from the standpoints of paleontology, taxonomy, morphology, anatomy, embryology, distribution, domestication, mutation, and the formation of new races through crossing is presented and summarized. (2) The theories of Lamarck and Darwin are treated critically in connection with a general treatment of the method of evolution. The 2 main viewpoints (Lamarckism and Darwinism) are first clearly stated with their modern additions, followed by a detailed critique. The Darwinian position involves the discussion of its methods, the struggle for existence, natural selection, absence of selective values, protective coloration and mimicry, sexual selection, and a critique of Neodarwinism. In connection with a modern restatement of the Lamarckian position, there is a discussion of somatic induction (influence of abnormally low temperatures, crystallotoxic serum influence in the production of abnormalities associated with the lens of the eye, the influence of yellow light on the chemical nature of the parental blood, and thus indirectly on the germ plasma), parallel induction, limited action of environmental factors, etc. A selected literature list of 33 titles, classified under 7 general heads, is appended.—*Orland E. White.*

5832. FRATEUR, J. J. EN A. DUMON. Latente factoren bij Konijnen. [Latent factors in rabbits.] Naturwetenschapp. Tijdschr. 5: 112–117. 1923.—A series of experiments demonstrated that the cooperation of 2 factors produces an entirely different phenotype than when certain factors are separated. The absence of 2 cooperating factors is in its turn the cause of another phenotype. Pearl gray has been given the formula  $A2B2$ , where  $C$  is a factor which changes pearl gray into blue, and the identification factor  $D$  adds to pearl gray a brown color.



A cross ♀ blue with ♂ brown gave an offspring of 10 individuals (5 brown and 5 black). The 1:1 ratio was due to the ♀ being heterozygous for *C*. Factors *C* and *D* together gave black color. The absence of *C* allows the identification factor *D* to influence the pearl gray color. This is not true, however, in all factor combinations. Experiments in rabbits showed the existence of latent inheritable factors. (1) There are albinos which do not possess the factor *A* and (2) the yellow of the type Fauve de Bourgogne which lacks factor *B*. In a cross albino Angora ♂ No. 723 with ♀ pearl gray, pearl gray and pearl gray with the "fire factor", there were obtained 4 pearl gray agouti, 6 blue agouti, 6 brown agouti and 4 black agouti. All young animals had the wild factor and not 1 had long hair. Angora hair is recessive to short hair. The albino was homozygous for the same factors *G* and *L* which Goldschmidt used in his studies with mice. The color factor *B* was present in a double dose. Further *C* and *D* were in heterozygotic condition, consequently the heritable formula of the albino Angora was *B<sup>2</sup>CDG<sup>2</sup>L<sup>2</sup>*. Former experiments with pearl gray females have shown them all to be homozygous for the factor *I*, which keeps the hair short. Their inheritance formula was respectively *A<sup>2</sup>B<sup>2</sup>L<sup>2</sup>I<sup>2</sup>*, *A<sup>2</sup>B<sup>2</sup>L<sup>2</sup>I<sup>2</sup>* and *A<sup>2</sup>B<sup>2</sup>FL<sup>2</sup>I<sup>2</sup>* in which *F* stands for the fire factor, but this was not considered as it is hypostatic to factor *G*. The factors of each individual of the offspring are considered in detail. Detailed results of a number of crosses are given.—*J. C. Th. Uphof*.

5833. G[ATES], R. R. **Recent genetics.** *Nature* 113: 252-253. 1924.—From a review of several recent genetical articles the author draws the conclusion that results in heredity and cytology are coming to be appreciated and used more and more by the systematist and by the descriptive and experimental biologist. The relation of mutations and resultant isolation to taxonomy is shown in a study by Chapman of the South American finch genus, *Buarremon*, which has produced several mutants kept distinct by isolation.—*L. R. Waldron*.

5834. GOLDSCHMIDT, R. AND S. MINAMI. Über die Vererbung der sekundären Geschlechtscharactere. [The heredity of secondary sexual characters.] *Studia Mendeliana*. 65-77. 2 fig. Typos: Brünn, Czechoslovakia, 1923.—Data are presented on the hereditary transmission of color differences in the hairy tuft at the tip of the female abdomen of European and Japanese races of gipsy moth. The indications are that the effects are at least mainly due to a series of multiple allelomorphs. The character is not normally present in males but intersexual males may possess the tuft, in which case the phenotypic ratios shown for tuft color are the same as those shown by females.—Essential similarity is pointed out between Bridges' explanation—in terms of a balance between plus and minus modifiers—of sex-determination in *Drosophila*, and the hypothesis of Goldschmidt elaborated to explain gipsy moth intersexes, involving the relative potency of genes concerned in the production of maleness and of femaleness. A valid explanation of sex-determination and of transmission of secondary sexual characters must include consideration of the physiology of development, in particular of the activity of hormones, as well as of the mendelian mechanism. As a possible factor in sex-limitation is suggested a sex difference in rate of sexual differentiation and in time of its completion, the time necessary for the development of a given secondary sexual character being longer than the time of completion of sexual differentiation for one sex but not longer than that time of completion for the other sex.—*Helen Redfield*.

5835. GOODACRE, W. A. **Colour and stamina in bees.** *Agric. Gaz. New South Wales* 35: 221. 1924.—In breeding Italian queens care should be taken to select brightly colored individuals only when it is known that color is correlated with other good qualities.—*L. R. Waldron*.

5836. GRAHAM, R. J. D. **The question of the inbreeding of rhododendrons.** *Garden* 88: 110-111. 1924.—The author discusses briefly the inbreeding of rhododendrons, stating that this method of procedure gives as desirable horticultural forms as the parents.—*George L. Slate*.

5837. GUYER, M. F. **The germ cell and serological influences.** *Proc. Amer. Phil. Soc.* 62: 274-291. 1923.—This is a general survey and discussion of the author's experiments on the alteration of the germinal constitution through immunological influences, with comments on the importance of the results in various connections. The author enumerates arguments and evidence which have been urged in negation of belief in inheritance of acquired characters. While they are mainly negative, he admits that taken together they make it improbable that somatic acquirements often become established as germinal modifications. He then dis-

cusses immunological reactions in general, before passing on to a description of his experiments. He describes at length types of eye defects produced in rabbits as a result of injection at proper stage of fetal development of fowl serum containing lens-antibodies. "Of 61 surviving young from mothers thus treated, 4 had one or both eyes conspicuously defective and 5 others had eyes that were clearly abnormal." Another line of rabbits similarly treated confirmed these results; a 3rd line established by direct injection of pulped rabbit-lens gave 1 defective individual among 23. Similar results were obtained with direct injection of rabbit-lens into guinea pigs; and in New Zealand Red rabbits, by use of sheep serum immunized to rabbit lens. Transmission to the 9th generation has been established; but irregularities in expression are obtained, and the genetic mode of transmission is not clear. Transmission has occurred through both ♂ and ♀ lines.—It was shown also that animals may build antibodies against their own tissues. Serum of a rabbit which had received intravenous injections of its own spermatozoa became highly toxic to them. Likewise it was shown that following injury of the lens a rabbit developed lens precipitins. In animals which had inherited lens defects, it was found that the blood serum contained lens-precipitins.—Rabbit serum immunized to typhoid bacilli exhibited agglutination in dilutions of 1:720 to 1:1440. Immunization of successive generations, however, eventually gave rise to agglutination reactions in dilutions of 1:20,000 to 1:40,000. Young from a normal mother suckled by an immunized ♀ were found to acquire an agglutination reaction corresponding to that of the foster mother which they soon lost after weaning; whereas young from immunized mothers retained their reaction for a longer time. The author concludes that the serological mechanism may be responsible for incitement of certain of the changes which underlie evolution.—*R. E. Clausen.*

5838. HAGEDOORN, A. C., AND A. L. HAGEDOORN. **Twenty years of genetics.** *Studia Mendeliana.* 92-103. Typos: Brunn, Czechoslovakia, 1923.—Methods of geneticists are discussed, emphasizing desirability of better analysis of existing data and of planning future investigations with the primary aim of developing and testing theories. Present conditions governing scientific work are criticized and contrasted with those under which Mendel worked. The primary interest of scientific and practical men is contrasted and the difficulty of each understanding the viewpoint of the other is discussed. The author mentions frequent disagreement in beliefs of geneticists and practical breeders and the danger of drawing conclusions from work in a limited field. The value of genetics to practical breeders is discussed. Breeding methods are said to be usually worked out in advance of knowledge of their scientific basis. Geneticists' choice of material for investigation is discussed, and their manner of presenting results for the use of practical breeders. The author considers breeding most successful when selection is based on the end result desired, as profit or yield per acre, disregarding the individual contributing factors.—*W. P. Snyder.*

5839. HEMLEBEN, HANS. **Über Differenzierungsvorgänge in pflanzlichen Geweben.** [Differentiation in plant tissues.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 32: 377-383. 1924.—In a review of a series of articles written during the last 65 years our present knowledge of the behavior of certain isolated and non-isolated meristematic and differentiated cells relative to growth and to formation of new cells and tissues, is set forth. Differentiated cells, in certain cases, have the capacity to form all other tissues. Isolated differentiated cells grow but do not divide or transform material. Formation of cell walls comes about only in physical connection with pericambium or primary phloem. Meristematic tissues, when isolated, may form a complete system of tissues.—*L. R. Waldron.*

5840. HERIBERT-NILSSON, N. **Multiple monofactorielle Reduplication als der Ausdruck partialer Heterogamie bei *Oenothera fallax*.** [Multiple monofactorial reduplication as the expression of partial heterogamy in *O. fallax*.] *Hereditas* 5: 1-13. 1924.—An *Oenothera lamarckiana* which had colorless leaf-veins was crossed with pollen from *O. biennis* which carried a factor for red leaf-veins. The 337 F<sub>1</sub> plants were red-veined. The 164 F<sub>2</sub> plants also had red veins. However, in F<sub>3</sub> and subsequent generations, some white-veined plants appeared, in proportions which did not fit the ratios for normal diploid plants, supposing (1), that no homozygous red-veined plants ever appear, and (2), that the pollen-grains with the factor for red are of quicker growth. Thus, from a 22:3 ratio of red-veined to colorless-veined in one



F<sub>2</sub> sibship, which the author tentatively assigns to a 3:1 ratio, we have an F<sub>4</sub> sibship segregating as 133:2. This, however, is not usually the case; for, on the whole, proportionately more white-veined plants appear in certain F<sub>4</sub> and F<sub>5</sub> lines. Various plants of F<sub>4</sub> with red veins were selfed and crossed both ways with colorless-veined plants of the same sibships. From 1 line which gave 130:6 in F<sub>4</sub>, 8 red-veined plants were taken. The totals for red by colorless were 113 red: 345 colorless-veined, which the writer considered a 1:3 ratio. In the reverse cross of colorless by red-veined, 3 of the crosses gave apparently a 3:1 ratio, and 5 totalled to a 7:1 ratio. The selfed reds behaved like the crosses of colorless by red. In another line from the same original cross, which gave a 48:1 ratio in F<sub>4</sub>, the cross of 5 red plants by colorless gave 58:151; but the reverse cross produced 131:1, and the selfing of the reds 98:9. To explain these results, normal, diploid segregation is assumed, together with a reduplication of gametes in the proportions of 3:1 for the pollen, and 3:1, 7:1, and 63:1, or perhaps other ratios, for the egg-cells.—*John Belling*.

5841. HERTWIG, PAULA. Bastardierungsversuche mit erkannten Amphibieneieren. [Hybridization investigations with denucleated Amphibian eggs.] Arch. Mikrosk. Anat. Entwicklungsmech. 100: 41-60. 3 fig. 1923.—Amphibian eggs after first being, in effect, enucleated by treatment with mesothorium radiation and then fertilized, form "merogonic" embryos which are haploid as proved by nucleus measurements and chromosome counts. The cytoplasm has not been injured significantly, since treatment of the sperm gives only results identical with treatment of the egg only (when sperm and egg used are of same species). A method is thereby provided for studying the mode of action of chromatin in development by comparing haploid embryos from treated eggs fertilized by sperm of the same species with haploid embryos from treated eggs fertilized by sperm of a different species from the egg, and with diploid hybrid embryos and normal controls. Four such experiments were carried out with Anura: (1) *Rana arvalis* × *R. temporaria*, (2) *Bufo communis* × *B. virilis*, (3) *B. communis* × *B. calamitas* and (4) *B. virilis* × *B. communis*. In all 4 cases, haploid embryos from sperm of species different from the egg never developed beyond the gastrula stage having horseshoe shaped blastopore lip, often persisting at this stage about a day and dying at the age of 2-3 days, before specific or generic characters visibly differentiating the species crossed have an opportunity to become developed. On the other hand some of the haploid embryos from sperm of the same species as the egg lived to the larval stage of 8 to 14 days in crosses 1, 2 and 3 (eggs for cross 4 not being available here); and diploid embryos from cross fertilization of non-treated eggs in crosses 1, 2 and 3 showed ability to develop still further—in some cases, especially cross 2, going beyond metamorphosis (diploid hybrids of 4 died on or before the 12th day).—In the 2 Urodele crosses: (5) *Triton taeniatus* × *T. cristatus* and (6) *T. taeniatus* × *T. palmatus*, a fraction of the haploid embryos from sperm of species different from the egg developed to small, ill-formed larvae, having tail, small head, and occasionally pigment and heart beat, and reached a maximum age of 18 days, but even in larvae of this age specific characters can probably not yet be distinguished morphologically. Some of the haploids from sperm of the same species as the egg developed considerably further, dying between the 22nd and 27th day, and many diploid hybrids were completely viable. A single embryo from a treated, cross-fertilized egg of cross (5) developed much further than the others of this group and proved to be diploid, the paternal nucleus having apparently reduplicated. Results of the foregoing experiments parallel those secured independently by Baltzer with crossed Amphibian eggs enucleated by cutting, and Boveri's previous work on merogony in echinoderms. Haploidy in itself is deleterious, even if the sperms are of the same species, and haploids ordinarily can not reach maturity. The presence of a foreign nucleus in diploid hybrids also tends to be deleterious; haploid merogonic eggs from crosses suffer from both unfavorable conditions at once. The beginning of gastrulation is often a critical stage; it is then that nucleo-trophic substances originally left by the breakdown of the pre-maturation egg nucleus have become used up and new nuclear and plasma substances must be formed by growth, involving the utilization of the yolk, etc. An invisible differentiation often begins here also, the cells losing their equipotency. Previous to this time the chromatin from the sperm was active and its reactions were necessary for cleavage and increase of nuclear volume, but after this the roles of the sperm chromatin multiply and normal development requires a nicer adjustment of the

reacting chromatin material to the specific egg substances than before, for the processes of yolk conversion, differentiation, etc. Though these are "general" or fundamental processes, their course depends on specific substances differing from species to species as proved by the abortive development of haploid hetero-spermic as compared with haploid iso-spermic radiated eggs. It is not necessary, then, to observe specific characters morphologically differentiating the species (e.g. pigment differences) to prove the specific nature of sperm chromatin reactions in early development. We may conclude that "general" fundamental characters of development as well as superficial species-differentiating marks have their basis in the chromatin, and that in fact, there is no real ground for a basic distinction between the 2 types of characters, both involving specific substances that differ from 1 species to another. Sperm chromatin unsuited to react properly with egg protoplasm in early development (as shown by abortive development of haploid hetero-spermic embryos) may nevertheless function later (in diploid hybrids) to cause specific species-differentiating marks. Boveri's and Baur's definitions of heredity fail to distinguish between real heredity (through these chromatin substances) and the developmental role of the plasma.—*H. J. Muller.*

5842. HILGENDORF, F. W. Natural self-fertilization of wheat on a large scale. *Trans. and Proc. New Zealand Inst.* 54: 574-576. 1923.—Frost of a certain intensity can lead to the self-fertilization of wheat and this is a cause of the occurrence of new varieties.—*Wm. Randolph Taylor.*

5843. HOFFMAN, HERMANN. Vererbung und Seelenleben. Einführung in die psychiatrische Konstitutions- und Vererbungslehre. [Heredity and psychic life. Introduction to the study of psychiatric constitution and inheritance.] v + 258 p., 104 fig. Julius Springer: Berlin, 1922.—This work is primarily a treatment of inheritance as it relates to the mental make-up of the individual, from the standpoint of a psychiatrist. The subject matter is grouped under 6 general headings, the first 2 sections (49 pages) being devoted to a detailed statement and discussion of the various phases of modern genetics, such as Mendel's law and its explanation, the inheritance of sex, linkage of factors, crossing-over, non-disjunction and other complications, lethal factors, cumulative effect of similar factor expressions (homomerie), Goldschmidt's theory of quantity factors (factors with different "valencies"), mutation and the origin of new hereditary characters, the chromosome mechanism, dominant and recessive inheritance, partial or incomplete dominance and recessiveness, dominant and recessive sex-linked inheritance, sex-limited inheritance, distinct hereditary units with the same phenotypic expression, inbreeding, etc.—Section III is a treatment in detail of the psychic make-up or constitution. Types of mental "constitution" and their relation to temperament are considered.—Section IV is devoted to nervous degeneration, especially from the standpoint of cause.—Section V (151 pages) is divided into 11 sub-sections, each of which deals with a special aspect of inheritance as related to mental "constitution" and to different types of temperament. Among the subjects discussed are intelligence, talent, genius, insanity, senility, paranoia, sexual perversion, moral insanity, epilepsy (genuine and otherwise), melancholia, feeble-mindedness, idiocy, imbecility, mental debility, dementia praecox, etc. The last section (VI) deals with the practical implications of investigations on heredity. Appended is a bibliographical list of 149 titles, classified to correspond to the sections and sub-sections.—*Orland E. White.*

5844. HOKANSSON, ARTUR. Über die Chromosomenzahl einiger *Oenothera gigantea*-Pflanzen. [The chromosome number of some *O. gigantea* plants.] *Hereditas* 5: 93-96. 1 fig. 1924.—Of the strain of *Oenothera* called by Heribert-Nilsson "*gigantea*", 5 plants were examined as to their chromosome numbers, the somatic metaphases in the buds being counted. Three plants had the tetraploid number of 28 chromosomes. One plant appeared to vary from 28 to 32, apparently through cross fracture of chromosomes. One plant had the diploid number of 14 single chromosomes.—*John Belling.*

5845. HUXLEY, JULIAN S. Late fertilization and sex ratio in trout. *Nature* 112: 828-829. 1923.—Following experiments in which the author obtained a higher percentage of males amongst brown trout by late fertilization of eggs held over in the body of the mother for 4 to 14 days, he determined the effect on the sex ratio and mortality of ageing the eggs outside the body before fertilization. Eight hundred forty-five eggs, obtained from a single ♀,



were divided into 3 groups, (A) fertilized immediately, (B) kept in a dish for 2 days and then fertilized, (C) kept for 4 days and then fertilized, all by sperm from the same male. The percentage that died before hatching, and also, somewhat less markedly, the percentage of those hatched that died before 8 months of age was much greater in both B and C than in A; but the differences between any of the 3 groups in regard to the sex ratios of those hatched or of those that lived to 8 months, were not significant, except perhaps that there was a doubtfully significant excess of ♀ deaths over males, between hatching and 8 months, in the group from eggs kept 4 days. The significant deviations from the 1:1 ratio observable among adult trout in hatcheries, which is said to vary from year to year, is hence apparently due to differential elimination, but the causes of the latter remain to be explained.—*H. J. Muller.*

5846. JIVANNA RAO, P. S. Pollen sterility in relation to vegetative propagation. Jour. Madras Agric. Students Union 11: 419-426. 1923.—Flowers of about 30 different plants were examined for extent of sterility. The list includes some grasses and plants that propagate vegetatively in nature and a few grafted trees, besides other plants that are raised from cuttings. The author concludes that it is wrong in principle to propagate, solely by vegetative means, crops like pepper, cardamom, vanilla, moringa and others which are valued for their fruit or seed, and he suggests that suitable modifications of the current methods of propagating plants may be introduced so as to ensure retention of full vigor.—*Author.*

5847. KEARNEY, THOMAS H. Inheritance of petal spot in Pima cotton. Jour. Agric. Res. 27: 491-512. 1 pl. 1924.—Egyptian cotton, like the related Sea Island cotton (*Gossypium barbadense* L.) is characterized by a conspicuous red spot near the base of the otherwise yellow petal. Two individuals of the Pima variety of Egyptian cotton gave rise to families breeding true for absence or very faint development of the spot. Representatives of these families were crossed with members of an inbred family of the same variety breeding true for normal development of the spot. Full spotted was almost but not quite dominant in  $F_1$  and there was sharp segregation in  $F_2$  into a conspicuously spotted and a nearly spotless class, in a ratio not departing significantly from 3:1. All  $F_3$  progenies of individuals representing the 2 extremes of the  $F_2$  distribution were uniformly full-spotted and spotless, respectively, while all  $F_3$  progenies of  $F_2$  individuals which were most nearly intermediate in development of the spot segregated sharply in a ratio not departing significantly from 3:1. Spotless as contrasted with full-spotted is therefore a simple recessive. The evidence did not permit a definite conclusion as to whether modifying factors also occur. The sharpness of the segregation is interesting in view of the variability of the spot, even among flowers opening on the same day on the same individual plant. In both spotted and spotless populations the degree of development of the spot is positively correlated with length of corolla but there appears to be no linkage of the 2 characters. Both spotless families are typical Pima except in this character and in having super-normal percentages of 4-lock bolls. As there is no linkage between spotless and a high percentage of 4-lock bolls, the presumption is that the progenitors of these families were closely related if not sister plants. Attention is called to the possible importance of spotless petal as the "hallmark" of an agriculturally valuable strain, facilitating removal of accidental hybrids with the normally spotted stock of the same variety.—*Author.*

5848. KEMPTON, J. H. Inheritance of proterogyny in maize. Amer. Nat. 58: 182-187. 1924.—Proterogyny, which is the normal condition in *Tripsacum*, *Euchlaena* and *Coix*, has been found to be normal also in a variety of maize from Spain. In hybrids with normal proterandrous maize the proterogynous condition behaves as a recessive character and the  $F_1$  is proterandrous. Proterogynous plants are recovered in the  $F_2$ , though in too few numbers for a simple mendelian character. The frequency distribution of the  $F_2$  plants of the maize hybrid is very similar to that obtained in teosinte-maize hybrids. From the occurrence of ♂ sterile plants and the character of the frequency distribution, it seems probable that proterogyny in maize is the result of a variable expression of a ♂ sterile condition, the variability being brought about through the interaction of modifying factors.—*Author.*

5849. KUHLMANN, EUGENE. L'hybridation de la vigne et la creation d'hybrides producteurs directs. [Hybridization of the grape and the creation of hybrids immediately produc-

tive.] *Rev. Vitic.* 59: 253-260. 1923.—Types of grape flowers are briefly described and the method of emasculating and fertilizing flowers and handling of seed and seedlings is discussed. To hybridize European grapes with American sorts which flower about 10 days earlier, the forcing of the flowers of the former under glass is advocated. According to communications, M. Seibel takes flowers when fully open and conserves them 1 year for fecundation purposes. A brief discussion is given of hybridization work with European grapes. Results obtained in crossing the European with the American grape in order to combine the resistance to phylloxera and fungous diseases of the latter, and the desirable wine-making fruits of the former are discussed in detail. A few promising such hybrids are noted.—*Richard Wellington.*

5850. LANDAUER, WALTER. Untersuchungen über die Verschiebung der Vererbungsrichtung bei Echinodermen-Bastardlarven unter dem Einfluss von Ammoniak. [Shifting the direction of heredity in hybrid echinoderm larvae under the influence of ammonia.] *Arch. Entwicklungsmech.* 52-97: 1-94. 15 fig. 1922.—Eggs of *Sphaerechinus granularis* were treated various lengths of time with ammonia, then fertilized by spermatozoa of *Strongylocentrotus* (*Paracentrotus*) *lividus*. The skeletons of the hybrid plutei were, in form and size, very similar to those of pure *Echinus*, not intermediate as are normal hybrid larvae. In fertilization there is true copulation of egg nucleus and sperm nucleus. In subsequent mitoses the paternal chromosomes regularly take part; only in rare cases does paternal chromatin come to lie outside the spindle. The haploid chromosome numbers 20 for *Sphaerechinus* and 18 for *Strongylocentrotus* are confirmed. The form of the chromosomes as described by Baltzer is not confirmed; the 2 hook-shaped ones of Baltzer may be wanting, actually 4 chromosomes in number. No evidence is found for the regular suppression of any of the paternal chromatin.—The chromosome number in eggs cleaving with monasters varied between the haploid and diploid, because some chromosome-halves, after splitting, promptly fused again. Mactroclinous hybrid plutei have larger nuclei, the nuclear surface being proportional to the chromatin content, whereas in the unfertilized egg the volume of the nucleus is proportional to the chromatin content. Several other size relations are given.—*A. Franklin Shull.*

5851. LOVE, H. H., AND W. T. CRAIG. Methods now in use in cereal breeding and testing at the Cornell Agricultural Experiment Station. *Jour. Amer. Soc. Agron.* 16: 109-127. 8 fig. 1924.—Detailed methods are given for determining comparative yields of small samples considered as selections from within a variety, as samples from different varieties, or as samples resulting from hybridization. Comparisons are made mainly between rod rows replicated 5 or 10 times with check plats. In the "advanced-test," 3 adjacent rod rows are planted and repeated as desired. The more promising are further tried in drill plats, each measuring 9 by 100 feet, sown in duplicate or triplicate. Pure seed stocks are maintained by planting in special seed rows. In all planting, weighed samples are planted by hand at the rate of 2000 rows per day with a crew of 5 men. Harvested rows are hung under cover and threshed at the rate of 700 per day. Hybridization is done in the greenhouse where, also, the  $F_1$  generation is grown. Notes are given on calculation and interpretation of yields.—*L. R. Waldron.*

5852. MALINOWSKI, EDMUND. Analiza genetyczna kształtów nasion Fasoli. [Genetic analysis of seed shape in *Phaseolus vulgaris* L.] *Pamiętnik Zakładu Genetycznego Szkoły Główniej Gospodarstwa Wiejskiego* 1: 123-178. 5 pl., 8 fig. 1921.—With French résumé.—Twenty varieties of beans were used in these experiments. Results of crosses showed that the length, width, and thickness of bean seeds are determined by cumulative genetic factors. Segregation in the  $F_2$  generation from crosses is of 3 types. (1) Intermediate segregation where all types are within the extremes of size of the parents. (2) Transgressive segregation where certain types exceed the dimensions of both parents. (3) Asymmetrical transgressive segregation where the types exceeding the dimensions of the parents are greater at 1 extreme than at the other. This 3rd type of segregation in the  $F_2$  is explained by supposing that the cumulative factors produce in the heterozygous state only  $\frac{3}{4}$  of the effect of the homozygous state. Asymmetrical transgressive segregation, when the dimensions of the larger parent are exceeded, is called "heterosis." The fact that seeds of greater



width than length never appear is explained by linkage between the factors for the 3 dimensions. Tables, graphs and plates show detailed results of these experiments.—*Charlotte Elliott.*

5853. MALINOWSKI, EDMUND. O mieszańcach kapusty z jarmuzem. [Hybrids of headed with headless cabbage.] *Pamiętnik Zakładu Genetycznego Szkoły Głównej Gospodarstwa Wiejskiego* 1: 1-14. 6 pl. 1921.—French résumé.—Linkage was observed in the  $F_2$  generation of hybrids from head cabbage and kale. The factor for heading was linked with the factor for non-curled leaves and the factor for non-heading with the factor for curled leaves. Plants of the  $F_1$  generation were intermediate in respect to these characters. The  $F_2$  generation showed plants resembling either parent and all gradations between, but no curly leaved headed plant and no smooth leaved plants without heads. Occasionally crossing over occurs but in general the correlation holds.—*Charlotte Elliott.*

5854. MOHR, O. L. Modifications of the sex-ratio through a sex-linked semi-lethal in *Drosophila melanogaster*. (Besides notes on an autosomal section deficiency.) *Studia Mendeliana*. 266-287. 2 fig. Typos: Brünn, Czechoslovakia, 1923.—The recessive mutation chlorotic (*cc*) is described, which kills a large proportion of chlorotic males and of homozygous chlorotic females in the pupal stage. The main visible effect is the changing of the body color to a greenish yellow. The *cc* gene has a locus of  $-0.1$  in the X-chromosome. A female heterozygous for chlorotic crossed with a wild-type male gives a sex-ratio of 2 ♀ : 1 ♂. A ♀ heterozygous for chlorotic mated to a chlorotic ♂ gives the ratio 1 ♀ : 1 ♂ in spite of the presence of a semi-lethal. Homozygous chlorotic females crossed by wild-type males give approximately 2 ♀ : 0 ♂, and the ratio is more nearly approached the poorer the cultural conditions. Homozygous chlorotic females mated to chlorotic males yield very few flies, but the 1 ♀ : 1 ♂ ratio is maintained. In case no visible somatic effect had accompanied the lethal, the results would have appeared confusing.—A preliminary report is given of a 2nd chromosome dominant, gull (*G*), the locus of which is at about 10. Gull flies show among other effects the holding of the wings at a wide angle from the body and the shortening of the distance between the cross veins. Because of the following effects gull is considered due to a section deficiency: (1) Dominant character changes are produced; (2) there is a recessive lethal effect; (3) fat (a new chromosome-II recessive, locus about 9.8) appears somatically in individuals containing gull in one chromosome-II and fat in the homologue; (4) the gull-fat compounds show exaggeration effects, high mortality, and low productivity; (5) the amount of crossing over between star and streak, between which gull lies, is decreased about 1% when gull is present. The deficient section does not include the vortex locus. Gull is the first autosomal dominant of the ordinary type the genetic base of which has been shown to be a section deficiency.—*Helen Redfield.*

5855. MOL, W. E. DE. Die Veredelung der holländischen Varietäten von *Hiacynthus orientalis* L. und damit im Zusammenhang; einige Ergebnisse über Selbstbestäubung und Kreuzbestäubung bei diploiden und heteroploiden Formen dieser Pflanzenart. [Improvement of Dutch varieties of *H. orientalis* L.; some results concerning self- and cross-fertilization with diploid and heteroploid forms of this plant-species.] *Studia Mendeliana*. 161-168. 1 pl., 1 fig. Typos: Brünn, Czechoslovakia, 1923.—Diploid hyacinths are being replaced by their larger and more robust heteroploid mutants. Self-fertilization is practically excluded in diploid as well as in heteroploid plants, even bud variants being too nearly like the plant from which they arose to set seed when crossed to it. This fact and the fact that seed plants do not bloom for 6-7 years would make genetical analysis very difficult even if more diploid varieties were available. Since crossing occurs as readily between diploid and heteroploid varieties as between diploids, the time of the diploid varieties is thought to be very limited.—*Margaret C. Mann.*

5856. NOACK, KONRAD L. Entwicklungsmechanische Studien an panaschierten Pelargonien. Zugleich ein Beitrag zur Theorie der Periklinalchimären. [Studies on the developmental mechanics of chlorophyll defective Pelargoniums. Also a contribution to the theory of periclinal chimeras.] *Jahrb. Wiss. Bot.* 61: 459-534. 56 fig. 1922.—From histological and cytological studies of development in Pelargonium, Noack concludes that the young leaf blade grows in a basipetal fashion. Subepidermal meristematic cells at the

margin of the blade divide tangentially. The innermost cells then give rise by further division and enlargement to the mesophyll, at first 4-layered but later becoming 6- or 7-layered by further divisions of the middle layers. The outermost cells continue the process of tangential division as described. Growth of the blade in length follows the same course. Since this process may be traced back to the moment at which the 1st suggestion of the outgrowth of a leaf rudiment from the growing point may be recognized, he concludes that the entire mass of cells in the leaf-blade and petiole, aside from the epidermis, has its seat of origin in a single subepidermal layer of the growing point. During the typical marginal or terminal growth which proceeds in basipetal succession until all the leaf rudiments are laid down, the cells are in the meristematic condition. During the subsequent increase in size of the blade by further division and enlargement of cells, the cells are in a semi-meristematic condition.—From the foregoing results Noack concludes that the white-margined *Pelargonium*s are not dichlamydeous periclinal chimeras in the sense of Baur. As an alternative hypothesis he suggests that the cells of the growing point are equipotential as respects determiners for chlorophyll production; and that at some stage in cell ontogeny a critical phase occurs at which the future character of the cell and its descendants is determined irreversibly. For forms which differentiate in this manner from a homogeneous growing point, he proposes the term, "mantle chimera." He assumes that the postulated critical phase occurs at the time of transition from the meristematic to the semi-meristematic condition. Reversionary white or green shoots are assumed to arise by formation of adventitious buds in groups of cells which have passed through the critical phase.—Noack also rejects Baur's hypothesis of random distribution of green and white plastids during the development of seedlings in favor of the assumption that the character of particular cells must be determined at a later period in ontogeny in a manner similar to that which occurs in the critical phase described above. He rejects also the assumption that sectorial chimeras depend upon a sectorial distribution of genetically distinct tissues in the growing point. He holds that nothing is known as to the nature of the processes which occur in the cell at the critical phase, or of the causes which lead to the characteristic distribution of white and green portions; but suggests that they must be resident in the fundamental organization of the plant, although subject to a certain degree of variation.—From a survey of the literature and from some preliminary investigations of his own, Noack concludes that the process of development described for *Pelargonium* is of general occurrence. He, therefore, admits the occurrence of haplochlamydeous periclinal chimeras (dermatogen genetically differentiated from inner core), but rejects on developmental grounds the possibility of the existence of dichlamydeous periclinal chimeras (dermatogen and subepidermal layer distinct from inner core) in such forms as *Pelargonium*, the *Crataegomespilus* and *Solanum* graft symbionts, etc.—*R. E. Clausen*.

5857. PAINTER, T. S. Studies in mammalian spermatogenesis. II. The spermatogenesis of man. Jour. Exp. Zool. 37: 291-335. 6 pl., 4 fig. 1923.—The testes of 1 white man, and of 2 negroes, preserved immediately after removal from the body, comprises the material for this study. The spermatogonia of both races show 48 chromosomes. Two of these have no synaptic mates of like size or shape, and are identified as the X and Y components of the X-Y sex chromosome complex. Primary spermatocytes show 24 bivalent chromosomes. Among these is 1 made up of 2 very unequal parts, the larger rod-like body being the X, and the smaller rounded body the Y chromosome. The X and Y chromosomes are shown to segregate to opposite poles of the cell in the 1st maturation division. Hence a spermatozoon in man carries either an X, or a Y chromosome but never both. In this study emphasis is placed on the morphology and behavior of the individual chromosomes.—*Author*.

5858. PELLEW, CAROLINE, AND ASLAUG SVERDRUP. New observations on the genetics of peas (*Pisum sativum*). Jour. Genetics 13: 125-131. 4 fig. 1923.—Three groups of characters in garden peas and their genetic relation to certain other groups are reported on. These are normal and reduced stipules, normal and keeled wings, yellow pod and green pod, and cotyledon color. Plants with reduced stipules have stipules but slightly larger than those of *Lathyrus*. The form originated as 1 plant in a row of Sutton's Duke of Albany, and bred true at once. Normal  $\times$  reduced stipules in  $F_1$  gave all normal; in  $F_2$ , 3 normal: 1 reduced stipule. Crosses involving this pair (*S* and *s*) and the purple flower color factor pair (*B*



and b) demonstrated linkage of *B* and *S*, cross-overs being about 28 per cent. No linkage was found in tests with 9 other designated factor pairs. The form with keeled wings differs from the normal in that the wings resemble the keel, both in color and structure; its origin is described. In crosses it is a recessive, giving a 3-1 ratio in  $F_2$ . Experiments demonstrated linkage between it and the glaucous-emerald (leaves) factors, the cross-over classes being 20 per cent. Tested with 8 other designated factor pairs, no linkage was discovered. In the opinion of the authors, there are only 3 authenticated linkage groups known in *Pisum*, and these are indicated. In the "reduced stipules" family, 1 yellow podded plant arose and bred true, this plant also having pale, yellow wrinkled cotyledons and stems that turned yellow as they matured. The work of Mendel, Tschermak, and O. E. White on the genetics of yellow pod in peas [see Bot. Absts. 1, Entries 1314, 1315] is reviewed and the work of White is discussed in connection with their own results as the form which he worked with is believed to be, in respect to characters mentioned, genetically similar. The authors interpret their results for the present as indicating a triple allelomorphic series made up of: (1) true dominant yellow cotyledons associated with green pods, (b) green cotyledons associated with green pods, and (c) pale yellow cotyledons associated with yellow pods, though the cotyledon color is not to be understood as in any way directly dependent upon the pod color. The 3 members of this series, as regards dominance, stand in the order named—(a) being dominant to both (b) and (c); (b) being dominant to (c) but recessive to (a); and (c) being recessive to both, as found by White.—*Orland E. White*.

5859. PEZARD, A. Tissu interstitiel et caractères sexuels secondaires des oiseaux. Réponse à J. Benoit. [Interstitial tissue and secondary sexual characters in birds. A reply to J. Benoit.] Compt. Rend. Soc. Biol. 88: 245-247. 1923.—Since 1911 the author has supported the view that the male plumage of birds arises in complete independence of the testicle. Against Benoit's conclusion that the interstitial cells in certain birds which moult twice yearly (*Pyromelana franciscana* and *Hypochera chalybeata*) are responsible for the nuptial plumage, 3 facts are cited: (1) The 'castration alimentaire' which frequently occurs in the breeding of certain birds does not prevent the appearance of the nuptial plumage. (2) In certain other exotic species the females, when quite old, assume the plumage of the male (arrhénoïdie) and renew it with each moult. (3) The experiments of Zawadowsky, after ovariectomy in Rouen ducks gave a similar result. Removal of certain feathers of the nuptial plumage of *P. franciscana*, and keeping the bird at a constant temperature of 25°C. during 1 month (nothing is said of the degree of confinement involved) result in the renewal of feathers of the neutral instead of the nuptial type.—*Oscar Riddle*.

5860. PINNEY, EDITH. The initial block to normal development in cross-fertilized eggs. I. Crosses with the egg of *Fundulus*. II. Reciprocal crosses between *Ctenolabrus* and *Prionotus*. Jour. Morphology 36: 401-419. 2 pl. 1922.—The first stage at which a visible disturbance in the development of fish eggs fertilized by sperm of another species has been found to occur is during the anaphase of the 1st cleavage. Abnormalities here consisted of unequal and varying distribution, fragmentation, and possibly elimination of chromosomes; such irregularities in the 1st cleavage are followed by similar phenomena in the 2nd cleavage, and finally lead to abnormalities in the later development—although later abnormalities sometimes occur also in cases where the early cleavages were normal. The author reports that the early cleavage abnormalities occur in all eggs resulting from crosses of *Ctenolabrus* ♂ by *Stenotomus* ♀, *Menidia* ♀, or *Fundulus* ♀ and from the cross *Prionotus* ♂ by *Fundulus* ♀; they do not occur in eggs from the following crosses: *Ctenolabrus* ♀ by *Prionotus* ♂, *Stenotomus* ♂, *Menidia* ♂, or *Fundulus* ♂; *Fundulus* ♀ by *Stenotomus* ♂ or *Menidia* ♂ (latter cross by Moenkhaus). The author points to similar results of other workers on echinoderms. She holds that the mitotic disturbances probably depend on the physical condition of the egg cytoplasm, such as its viscosity, during the anaphase period. This condition is not altered by crossing, since the egg chromosomes behave normally in crosses, but the condition in the egg of 1 species may not be favorable in its action upon the chromatin from sperm of another species. It is argued that the nature of this reaction upon the foreign chromosomes—whether normal or abnormal—does not depend upon the individual genetic contents of these chromosomes but on the con-

trary involves the entire sperm chromatin as such, due to some developmental rather than hereditary peculiarity of the latter. Reasons for this conclusion are found in the fact that (1) the abnormality is confined to the anaphase, (2) it does not appear always to involve the same chromosomes but is variable in its expression at any given cleavage and (3) it occurs at more than 1 cleavage. Lack of correlation between the occurrence of these disturbances and closeness of taxonomic relationship may be explained by the fact that widely different chemical (genetic) compositions may sometimes result in similar physical conditions (e.g. viscosity) of the cytoplasm, whereas a slight chemical alteration may sometimes cause a large physical difference; this hypothesis might be tested by artificially altering viscosity, etc. It is suggestive, moreover, that eggs of different species which cross reciprocally without mitotic abnormality often show similar reactions towards sperm of still other species.—*H. J. Muller*.

5861. POLOWZOW, WERA. Über die Wirkung der Alkohalnarkose auf die Entwicklung der Seeigelleier (*Strongylocentrotus lividus*). [The effect of alcohol narcosis on the development of sea-urchin eggs.] *Arch. Mikrosk. Anat. u. Entwicklungsmech.* 98: 69-97. 1923.—Fertilized eggs subjected for a few hours to weak solutions of alcohol (2½-3%) show the following features in order of increasing narcosis: (1) Active and resting stages in cell divisions not synchronous; (2) single syncytia with peripheral nuclei, due to the narcotization of cytoplasmic processes of cell division without affecting the nuclear processes; (3) many-polar spindle in the center of a single syncytium with irregular karyokinesis; (4) single giant nucleus,—an egg in which both cytoplasm and nucleus have lost the motor function, vegetative processes alone active; (5) egg just maintained alive, vegetative functions also suspended; (6) degenerative forms. Suspension of the treatment reactivates the narcotized processes, so that in the case of syncytia, blastomeres are formed—at first irregular, later becoming more and more regular in size and synchronism of dividing.—These results indicate the existence of a complicated apparatus for the regulation of the normal cell functions in development.—*E. C. MacDowell*.

5862. PRZIBRAM, HANS. Artwandlung und Arterhaltung. (Species changes and species constancy.) *Studia Mendeliana*. 175-186. Typos: Brünn, Czechoslovakia, 1923.—Mutations are contrasted with modifications and their respective influences upon species formation are discussed. "The mutation theory may be designated as the pathology of genetics" is typical of the viewpoint of the author. Modifications in tail length and color of rats induced by temperature changes are shown, changes in tail length following the induced body temperature and not the habitat temperature. F. B. Summer's experiments on mice are quoted. Kammerer's experiments on proteus are quoted as further examples of inheritance of modifications. The task of mendelism will be to determine the conditions under which mendelian characters change and also to find the cause of dominance. The latter will perhaps only then take place if fermentation processes are involved.—*L. A. Waitzinger*.

5863. PUNNETT, R. C. Note on the genetics of the African marigold (*Tagetes erectus*). *Studia Mendeliana*. 187-191. 1 pl., 1 fig. Typos: Brünn, Czechoslovakia, 1923.—Horticulturists state that the grower of double African marigolds must expect a small percentage of singles in his cultures. Punnett shows that true breeding double races can be secured. Double is a simple dominant over single. A tubular form of floret appeared in the singles which was a simple recessive to the flat floret single type. The cross single-tubular × double-normal flat petal produced a 9:3:3:1 ratio in F<sub>2</sub>. Crosses of deep orange × light lemon yellow flower colors gave an intermediate condition in F<sub>1</sub>, and in F<sub>2</sub> a graded series of colors from deep orange to pale yellow.—*J. L. Collins*.

5864. RAMANATHAN, V. Some observations on Mendelian characters in sorghum. *Jour. Madras Agric. Students Union* 12: 1-17. *Illus.* 1924.—The author gives some data to indicate that pubescent glumes vs. glabrous glumes, red glumes vs. black glumes, glumes with red apex vs. self-colored glumes, spikelets with red pedicels vs. spikelets with non-red pedicels, wrinkled glumes vs. non-wrinkled glumes, awnless glumes vs. awned, open or loose heads vs. compact heads and red tinted grains vs. non-red, give a 3 to 1 mendelian ratio in the F<sub>2</sub> generation. The data were obtained from field crosses.—Considerable variation occurred in some of the characters, e.g., the variation in the awns and in the compactness of



the heads. Some of the data also indicate that some of the results cannot be fully explained on a simple 3:1 ratio but that a larger number of factors are involved.—George M. Reed.

5865. RIDDLE, OSCAR. A case of complete sex-reversal in the adult pigeon. Amer. Nat. 58: 167-181. 1 fig. 1924.—A ring dove (*S. risoria*) was under careful observation during 44 months. Eggs were laid before the beginning of this period, and 11 others were laid and details for them recorded immediately afterward. The bird was at first a normal ♀. Tuberculosis ultimately completely destroyed the (single) ovary. The bird meanwhile assumed the mating behavior, and later the crow of a cock pigeon. The bird's weight curve during 3 years of this period shows (1) an approximation to the weight of the ♂; (2) 1 highly abnormal fluctuation; and (3) continuous failure to show the normal seasonal fluctuations. A 2nd and later tuberculous invasion of visceral organs killed the bird (1917). At autopsy no ovary but 2 testes were found. The case parallels the fowl described by Crew. Both cases indicate that many previously described bird hermaphrodites were in fact cases of incomplete sex-reversal. The conditions under which both reversals were effected support the author's view that an increased metabolic rate distinguishes ♂ from ♀ organisms. The demonstration of the complete reversibility of sex in adult higher animals is a fact with wide and important bearings in biology.—Author.

5866. SACHS-SKALIŃSKA, MARJA. Bandania nad mieszańcami Tytuniu. [Research on Nicotiana hybrids.] Pomiennik Zakładu Genetycznego Szkoły Główniej Gospodarstwa Wiejskiego 1: 47-122. 2 pl. 1921.—(French résumé.)—The genetic constitution and inheritance of color in flowers of 2 species of *Nicotiana* were determined by means of hybrids carried to the 3rd and 4th generation. The corolla of *N. Langsdorffii* was yellow green due to the presence of grains of chlorophyll in the tissues. That of *N. Sanderae* was red violet due to a soluble anthocyanin pigment in the cell sap. In the 2nd and 3rd generations of hybrids, new types separated out, which differed from the parents both in color and distribution of pigment. This diversity of colors he attributed to the action of a number of factors. He found 8 independent genetic factors concerned in the complete pigmentation of *N. Sanderae*. After having determined the probable genetic constitution of *N. Sanderae* he undertook by synthetic crosses the reconstruction of a plant with flower pigmentation corresponding to *N. Sanderae*, with positive results in both crosses. In *N. Langsdorffii* 4 groups of factors were concerned in the pigmentation. His results with this species he explained on the supposition that the groups of factors for green were in the same chromosome. In rare cases crossing-over occurred. He also concluded from the separation of certain lines that 1 of the factors for green was not a simple factor but a group of factors side by side in the chromosome.—The 2 series of factors introduced by the 2 species were transmitted independently and might be present at the same time in a zygote.—Charlotte Elliott.

5867. SACHS-SKALIŃSKA, MARJA. Wielopostaciowość w liniach czystych Petunii. [Polymorphism in pure lines of Petunia.] Pamiętnik Zakładu Genetycznego Szkoły Główniej Gospodarstwa Wiejskiego 1: 15-33. 1 pl. 1921.—(French résumé.)—Races of plants which in literature are known as unstable or intermediate the author prefers to designate as polymorphous because in the majority of cases only 1 of the extremes of variability resembles a constant race.—He describes 2 such polymorphic races of Petunia, the constant form having infundibuliform flowers of a red violet color. One polymorphic race had at 1 extreme flowers like the constant form and at the other, narrow zygomorphic flowers with only traces of pigment at the throat of the lilac corolla. Between these extremes were all degrees of variation but there was a distinct correlation between form color and of corolla. The author believes this phenomenon is due to the quantitative variability of a single genotype. He says it is not possible to obtain a pure line of zygomorphic lilac flowers because they have the same genotypic composition as the infundibuliform red violet flowers.—The 2nd polymorphic race which he describes shows less deviation from the normal race and the variations occur infrequently. The 1st represents the "Mittelrasen" of de Vries, the second the "Halbrassen." These polymorphic races represent a particular type of variability of unknown cause. It is not hereditary nor due to environment.—Charlotte Elliott.

5868. SCHAFFNER, JOHN H. Influence of environment on sexual expression in hemp. Bot. Gaz. 71: 197-219. Pl. 11. 1 fig. 1921.—Hemp planted for several years in the spring

in the open, under normal conditions, developed as pure carpellate and pure staminate individuals. There was no confusion of sexuality. Seed, obtained, however, from the same source each year, planted for several winters in the greenhouse during the period of short daylight, not only developed plants that had their vegetative period reduced from about 9 weeks to about 3 weeks but also had their sexual expression greatly confused. Abundant irregularities were produced, such as stamens with normal stigmas, ovaries with stamens growing out of their sides, structures partly carpellate and partly staminate, as well as more typical, bisporangiate flowers. Both carpellate and staminate plants showed sex reversal, grading all the way from only a slight indication of the opposite sex to normal flowers of the opposite type. In extreme cases 88% of carpellate plants showed reversal to maleness and 80% of staminate plants showed reversal to femaleness. The author concludes that since sex is subject to experimental control in such extremely sexually dimorphic species as hemp, sexuality is a state or condition not mendelian in nature, but related to the functional activity of the plant. Both staminate and carpellate individuals contain all the potentialities for the perfect development of the opposite sex and reversal takes place in the vegetative tissues without any references to chromosome segregation or combination, which are the ordinary causes of mendelian phenomena.—*Author*.

5869. SCOTT, WILLIAM B. **Symposium on the inheritance of acquired characters. Historical sketch.** Proc. Amer. Phil. Soc. 62: 270-273. 1923.—This is a general survey in non-technical form of the problem of inheritance of acquired characters with emphasis on the historical development.—*R. E. Clausen*.

5870. SHARNGAPANI, S. G. **A few observations on paddy (*Oryza sativa*) crossing.** Agric. Jour. India 19: 48-50. *Illus.* 1924.—Special methods must be employed to cross paddy (*Oryza sativa*) successfully as the glumes are extremely delicate and form part of the mature seed. The 2 inner glumes enclose the paddy grain and to the innermost of these 2 are attached the ovary, stigma, and a few of the stamens. If they receive any injury likely to set up withering, the seed do not set. Emasculation must be done at least 2 hours before the flower opens. The glumes are gently pulled apart with the fingers and the stamens removed with a pair of bent forceps. Later, when the paddy flowers begin to open, these emasculated flowers are pollinated and the glumes closed and tied with a fine silk thread. If the glumes are not tied, they do not close properly and the percentage of successful crossing diminishes greatly.—*Aus* paddy will cross with *aman* or *sail* paddy and the *aman* again with wild paddy. If the former cross is to be made, *aus* paddy can be grown and made to flower in the *aman* season (October) while the *aman* cannot be made to flower in the *aus* season (July-August). In crossing with the wild paddy it is important to use the *aman* paddy as the ♀ parent and the wild as the ♂ parent, since the wild paddy spikelets shed before the grains are mature and hence are lost.—*Dorothy I. Neff*.

5871. SIEGLINGER, J. B. **Seed-color inheritance in certain grain-sorghum crosses.** Jour. Agric. Res. 27: 53-64. 1924.—The author found that crosses between Feterita and Sunrise Kafir gave in the F<sub>2</sub> generation 3 types of seed: (1) Brown seed with brown nucellar layer; (2) white seed with brown nucellar layer and (3) white seed with no brown nucellar layer. These results suggest a 2-factor difference: *B*, a factor for brown nucellar layer, which also may cause brown in the epidermis if factor *S* is present; and *S*, a factor for smooth or glossy pericarp.—A cross between Sunrise Kafir and Blackhull Kaoliang gave very similar results. A cross between Feterita and Red Kafir gave 4 classes of F<sub>2</sub> grains: (1) Brown seed with brown nucellar layer, (2) white seeds with brown nucellar layer, (3) red or pink seed with no brown nucellar layer and (4) white seed with no brown nucellar layer. The author interprets the results on the basis of a 3-factor difference. Sunrise Kafir × Red Kafir and White Kafir × Red Kafir give in the F<sub>2</sub> generation red tinted seed and white seed in the ratio 3:1.—*George M. Reed*.

5872. STIEVE, H. [German rev. of: MORGAN, T. H. *Die stofflichen Grundlagen der Vererbung.* [The physical basis of heredity.] Trans. into German by H. NACHTSHEIM. 291 p., 118 fig. Gebrüder Borntraeger: Berlin, 1921.] Arch. Entwicklungsmech. 51: 337-333. 1922. [See also Bot. Absts. 11, Entry 2434.]



5873. STOUT, A. B. **The physiology of incompatibilities.** Amer. Jour. Botany 10: 459-461. 1923.—The author calls attention to 2 types of incompatibility in fertilization: (1) Those between different species, which are deep-seated in physical and chemical differences, and (2) those between gametes of the same individual or of individuals belonging to the same species. In the 2nd of these types there is a great range of variation between almost complete compatibility and complete incompatibility. The degree of self-compatibility in an individual may be subject to cyclic changes and may be altered by cultural treatment.—*E. W. Sinnott.*

5874. STRATTON, M. E. **The morphology of the double kernel in *Zea mays* var. *polysperma*.** New York Agric. Exp. Sta. [Cornell] Mem. 69: 3-18. 8 fig. 1923.—The occurrence of a large number of double or triple kernels on the pistillate inflorescence of Blaringhem's *Zea mays* var. *polysperma* is shown to be the result of the development of vestigial flowers. The functioning of both flowers of a spikelet results in separate kernels arranged back to back, or in connate or semi-connate seeds. Since the 2 embryos of a connate seed develop from separate flowers, their genetic constitution, in so far as maternal characters are concerned, may be expected to differ as greatly as those of the embryos of any other 2 seeds from the same parent plant.—*J. H. Kempton.*

5875. VILMORIN, JACQUES L. DE. **L'hérédité chez la betterave cultivée.** [Heredity in the cultivated beet.] 153 p., 9 pl. (2 col.), 106 fig. Gauthiers-Villars & Cie.: Paris, 1923.—The author presents a monographic study of the origin, history, classification and genetics of the cultivated beet, a work on which he has been engaged for 15 years. Particular attention has been paid to the sugar beet. Wild beets have been experimentally cultivated and the preserved beet material in European herbariums has been exhaustively studied. Chapter 1 is devoted to classification. Fifteen of the 19 species enumerated in the Index Kewensis are retained, the others being regarded as synonyms. In studying the wild forms, pure races were secured and kept true with difficulty, owing to the prevalence of cross-fertilization.—Chapter 2 is devoted to a study of the hybrid forms of the wild beet crossed with the different cultivated varieties, and includes a summary of the work of Rimpau, Schindler, Proskowetz and others on this subject. *Beta vulgaris* (*B. maritima*) is regarded as the primary ancestor of cultivated beets, but presumably other species have played a part through hybridization. The study and history of the sugar beet furnishes the most detailed and connected story, while comparatively little is known of the origin of the mangelwurzel. Wild beets are always white rooted, except in the case of *Beta macrocarpa*. Moreover, mangelwurzels contain more sugar reducing agents than sugar beets. The origin of the garden beet is shrouded in uncertainty similar to that of the mangelwurzel, as it was still unknown in the 13th century. Chard (white beet or Poirée) has been cultivated from a very ancient period.—Chapter 3 is a history of the origin of the different cultivated varieties and a more or less extensive study of their stability. The early history of the sugar beet industry is given in detail with dates and names of the early workers. The oldest recorded observation on the presence of sugar in the sugar beet is that of Serres (1600). The first sugar beet factory was started at Cunnern, Silesia in 1802. The elliptical, bell-shaped garden beets flat underneath, seem to have originated in Germany.—Chapter 4, by far the most important is devoted to the genetics of beets, with particular reference to the increase of the sugar content. Marggraf (1745) first separated the sugar in the root and found 6.2% in the white forms and 4.5% in the red. The Abbe de Commerell in 1786 calls attention to the necessity of care in the selection of seed carriers. Louis de Vilmorin's (1850) contributions mark a new era, as he laid down the principle of genealogical selection which is to this day the fundamental principle used in increasing and maintaining sugar content. The variety Vilmorin with 16-17% sugar was commercialized in 1861. Then followed improvement as to shape.—Genetic studies on color, abnormalities, modern selection practices, heterosis, fixation of important characters and linkage are discussed and summarized. Judging from studies carried on at Verrieres there appears to be, a certain "linkage association between the elongated form (root) and the richness in sugar." Mendelism and the chromosome hypothesis are discussed in relation to beet breeding. A bibliography of 219 titles is appended.—*Jacques L. de Vilmorin and Orland E. White.*

5876. VRIES, HUGO DE. Über die Entstehung von *Oenothera Lamarckiana* mut. *Velutina*. [The origin of *O. Lamarckiana* mut. *Velutina*.] Biol. Zentralbl. 43: 213-224. 1923.—The mutant *velutina*, as well as the two other types, *O. deserens* and *O. decipiens*, are not produced directly from *O. Lamarckiana* but from the union of certain gametes of the "half mutants" *O. problandia*, *O. rubrinervis*, and *O. erythrina*, respectively. The latter segregates into *velutina* + *decipiens*, and *rubrinervis* into *deserens* + *velutina*. *Velutina* has not been produced from these half mutants but from the half mutant *problandia*, which in outward appearance is not different from *velutina* but does differ in the percentage of sterile seeds produced, the half mutant producing 27-34% sterile seeds while *velutina* regularly produces only 1-4% sterile seeds. The half mutant *problandia* regularly segregates into the 2 types in the ratio 3:1, the pure *velutina* type being recessive. In contrast to *Lamarckiana*, these mutants, *velutina*, *deserens*, and *decipiens*, show almost no tendency to throw mutant forms. Results from crossing these true breeding races leads to the conclusion that previous crossing is not the cause of the mutability characteristic of *O. Lamarckiana*.—J. L. Collins.

5877. WACKER, J. Die landwirtschaftliche Pflanzenzüchtung und ihre land- und volkswirtschaftliche Bedeutung. [Plant breeding and its agricultural and politico-economic significance.] Zeitschr. Pflanzenzucht 9: 35-49. 1923.—A popular presentation is given of the well-known principles of variability and inheritance on which the methods of plant breeding are based, illustrated by results obtained in his own experimental field, which show the increased yield and better quality of developed strains. Data are given on selections from hybrids of wheat and oats which yielded more than the parents in 1921 and 1922, and on "Steiner's roter Tiroler" spelt which averaged nearly 18% more grain, and straw of better quality than the parent variety. Use of such improved strains results in greater satisfaction to the grower, improved farms and farming methods, and larger domestic production with resulting decreased imports—all accomplished at comparatively small expense.—C. E. Leighty.

5878. WALDRON, L. R. Effect of first generation hybrids upon yield of corn. North Dakota Agric. Exp. Sta. Bull. 177. 16 p., 2 fig. 1924.—Crosses were made between Rustler (a white dent) and 12 other varieties—dent, flint, and 1 flour. Taking 3 years' results, the average  $F_1$  hybrid outyielded the average of the parents by 4.4 bushels, or 9.2%. In the cross, Rustler  $\times$  Mercer (a flint), the hybrid outyielded Mercer, the better parent, by 8.8 bushels, or 18.7%. The  $F_1$  hybrids showed no advance in earliness over the average of the 2 parents, but an increased height was noted and also, generally, an increased amount of suckering. The increased cost per bushel of producing the  $F_1$  hybrid seed was 65 cents.—Author.

5879. WILLIS, J. C. Is the theory of natural selection adequate? Nineteenth Century and After 92: 615-624. 1922.—Natural selection fails to explain the problems of distribution and size of genera, in common with many other problems of organic evolution. The age and area theory satisfactorily explains both problems. The distribution of the *Coleus* species in Ceylon and adjacent regions is an illustration. The distribution and abundance of the floras of 3 island groups off New Zealand, in connection with the New Zealand flora, can be predicted satisfactorily by the age and area theory. Size of genera and their distribution can also be understood by this theory which further explains the L-shaped curves which result from plotting number of genera against species per genus.—L. R. Waldron.



## HORTICULTURE

J. H. GOURLEY, *Editor*JOHN BUSHNELL, *Assistant Editor*

(See also in this issue Entries 5738, 5763, 5846, 6031, 6092, 6164, 6172)

## FRUITS AND GENERAL HORTICULTURE

5880. C[HEVALIER], A. *Les importations de café en France et la production des colonies françaises.* [Importation of coffee into France and colonial production.] *Rev. Bot. Appl. et Agric. Coloniale* 2: 367. 1922.—Data on the amount of coffee imported into France, and colonial sources of the importations are given. Indo-China alone shows an increasing amount of coffee produced.—*Paul Russell.*

5881. CHEVALIER, AUG. *Observations sur le noyer.* [The walnut.] *Rev. Bot. Appl. et Agric. Coloniale* 2: 338-342. 1922.—The cultivation of *Juglans regia* L. in France is discussed. The writer considers this industry from the standpoint of production and export, best varieties, propagation, preparation of the nuts for market, diseases and pests, exotic species of *Juglans* (*J. sigillata*, *J. duclouxiana*, *J. cordiformis*, *J. rupestris*, *J. torreyi*, *J. cinerea*, *J. nigra*, and *J. californica*), ruthless destruction of the trees for wood, and possible colonial substitutes (*Lagerstroemia* spp. and *Amoora gigantea*) for the walnut. Yunnan, China, is mentioned as a region capable of furnishing a large quantity of walnut timber although it is practically inaccessible.—*Paul Russell.*

5882. H., W. *Sinaasappelteelt.* [Orange growing.] *West Indië* 8: 106-110. 1923.—This is a report of a meeting to encourage orange growing in Surinam. Since production is greater than demand, the growing of oranges for foreign markets is recommended. The price of budded plants, trial shipments to the Netherlands, conditions in Trinidad and Damara, etc., are mentioned.—*J. C. Th. Uphof.*

5883. HARTMAN, HENRY. *The cane fruit industry in Oregon.* *Oregon Agric. Exp. Sta. Circ.* 48. 1-28. 10 fig. 1923.—A discussion is given of the problem of growing the cane fruits, including such topics as yields, location and site of plantation, suitable soils, varieties, pollination, propagation, duration of plantation, tillage, maintaining soil fertility, pruning and training, handling the crop, and dehydration.—*C. E. Owens.*

5884. HLITS, R. W. *Report on determination of moisture in dried fruit.* *Jour. Assoc. Offic. Agric. Chem.* 7: 112-118. 1923.

5885. LECOINTE, PAUL. *La culture et la préparation du manioc en Amazonie.* [Cultivation and preparation of cassava in the Amazon region.] *Rev. Bot. Appl. et Agric. Coloniale* 2: 331-337. 1922.—This is a general account of cassava cultivation and the preparation and uses of cassava, as found in the Amazon territory of Brazil. Data are given on methods of planting, harvesting, and propagation; methods of preparing the "farinha" are described; and production statistics are furnished. The writer points out that primitive methods still prevail in the growing and preparation of cassava for market, and concludes that the application of modern methods would prove very profitable.—*Paul Russell.*

5886. LOPEZ DOMINGUEZ, F. A. *Changes wrought in the grapefruit in the process of maturation. Part II. Factors affecting the composition of the fruit.* *Jour. Porto Rico Dept. Agric.* 54: 1-45. 5 fig. 1921.—Excessive rainfall affects grapefruit by delaying its maturity, by increasing its juice content, and by decreasing its solids and acids. Sandy soils seem to produce a slightly better quality of fruit than do clay soils, but the chemical composition of the soil does not seem to affect the quality of the fruit. The quantity of phosphoric acid and potash in the fruit is independent of the percentage of these materials in the soil. The N content of the fruit is, however, apparently dependent upon the amount of this element present in the soil. Sweating brings out the color of grapefruit, but this treatment has little effect upon its composition. Grapefruit in storage loses weight, and part of its sucrose undergoes inversion.—*Geo. H. Dungan.*

5887. McILWAINE, R. *The pecan nut (Carya olivaeformis).* *Rhodesia Agric. Jour.* 21: 59-61. 3 fig. 1924.—This is a general description of the pecan nut. Ten years ago 2 young

trees of each of the Delmas, Frotsher, and Schley varieties were planted in Salisbury Rhodesia, and to-day they are bearing fairly well.—*L. J. Goldblatt*.

5888. RANGANATHA RAO, M. S. The pruning of fruit trees. *Jour. Madras Agric. Students Union* 11: 75-77. 1923.

5889. SCHUSTER, C. E. Grape growing in Oregon. *Oregon Agric. Exp. Sta. Circ.* 43. 1-16. 5 fig. 1923.—Advice is given concerning the choice of location and soil type, the use of fertilizers, choice of varieties, pruning, and harvesting.—*C. E. Owens*.

5890. TRIBOLET, I. Olives. *Jour. Agric. Union South Africa* 7: 443-463. 14 fig. 1923.—Olive culture, processes of pressing and pickling, and pests to which this tree is subject are considered. There are at least 8 indigenous varieties in South Africa, and in parts of this country, the conditions, including climate, are ideal for successful culture, but returns are slow. The tree bears much earlier here than in some countries where its fruit figures as one of the principal outputs.—South Africa, though it has a fair number, does not possess all the noxious insects that are partial to the olive and are found in other countries.—*L. J. Goldblatt*.

5891. TURNER, A. G. Budding of Citrus trees. *Rhodesia Agric. Jour.* 20: 570-577. 15 fig. 1923.—The article deals with the budding and general care of young citrus trees from seed to the time of lifting from the nursery, and also with the top-working of old trees.—*L. J. Goldblatt*.

5892. WAGNER. Meine Erfahrungen auf dem Gebiete der Rebendüngung. [My experiences in vine fertilizing.] *Mitteil. Deutsch. Landw. Ges.* 38: 131-132. 1924.—As a result of many years trial it was shown that stable manure is more efficient as a fertilizer than chemicals; and that the fertilizer requirements of vineyards can be determined by chemical analyses of the ripe leaves. Vines developed normally when the dry matter showed not less than 0.45% phosphoric acid; 1.25% and 1.55% N.—*A. J. Pieters*.

5893. WILDEMAN, E. DE. Quelques notes à propos la culture du cocotier et de la préparation du coprah. [Notes on coconut culture and the preparation of copra.] *Rev. Bot. Appl. et Agric. Coloniale* 2: 343-350. 1922.—This is a very general and comprehensive review of coconut culture and the preparation of copra in various parts of the tropics. Three insects pests of the coconut (*Oryctes rhinoceros*, *Rhynchophorus ferrugineus*, and *Brachartona catoxantha*) are especially mentioned and remedies discussed.—*Paul Russell*.

## FLORICULTURE AND ORNAMENTAL HORTICULTURE

5894. ANONYMOUS. Exhibition of wild flowers. *Victoria Nat.* 40: 127-130. 1923.—A general discussion of notable species exhibited, and especially of species improved under cultivation, is given.—*Wm. Randolph Taylor*.

5895. BRAY, E. Beautiful Gladioli. Their culture and management. *South African Gard.* 13: 402-403. 1923.

5896. CHELVARANGA RAJU, J. Flower trade in Madras. *Jour. Madras Agric. Students Union* 11: 304-310. 1923.—Flower farming is a profitable concern and there is demand for the following: (1) Flowers—*Roses*, *Nerium odorum*, *Jasmine*, *Chrysanthemums*, *Leora coccinea*, *Polianthes tuberosa*, *Pergularia minor*, *Couroupita guianensis*, *Artabotrys odoratissimus*, *Pandanus odoratissimus*. (2) Scented leaves—*Artemisia Abrotanum*, *Marjoram* (*Origanum vulgare*), *Ocimum sanctum*, *Pogostemon Patchouly*. (3) Scented roots—*Plectranthus* sp.—*P. S. Jivanna Rao*.

5897. CHEVALIER, AUG. Acclimatation de l'Acacia dealbata dans le Nord-Ouest de la France. [Acclimatization of *Acacia dealbata* in northwestern France.] *Rev. Bot. Appl. et Agric. Coloniale* 2: 363-365. 1922.—The writer believes that this acacia might succeed in parts of northwestern France if given some protection in winter, and he recommends its trial.—*Paul Russell*.

5898. MATHEWS, J. W. The cultivation of South African Iridaceae. *Jour. Bot. Soc. South Africa* 9: 18-20. 1923.—The requisite growing conditions and propagation methods for certain species of Iridaceae are discussed.—*L. J. Goldblatt*.

5899. NAMBIAR, K. G. The sago palm (*Caryota urens*). *Jour. Madras Agric. Students Union* 11: 6-9. 1923.—Sago palms are found on the borders of coconut gardens in parts of



the western coast region of South India, 2 varieties being recognized. The tree yields several economic products, viz., a kind of flour from the pith, fiber from the leaves useful for making brushes, split trunks for house construction, and "jaggery" from the juice of the inflorescence.—The process of tapping is described.—*P. S. Jivanna Rao*.

### VEGETABLE CULTURE

5900. BOUQUET, A. G. B. **Economic results in the pollination of greenhouse tomatoes.** Oregon Agric. Exp. Sta. Circ. 55. 1-16. 4 fig. 1924.—It has been found possible to increase the yield of tomatoes greatly by hand pollination. Pollen is shaken out of the anthers onto the tip of the finger. Blossoms are then emasculated and the stigma is pollinated by touching with the pollen-covered finger.—Growers report that under ordinary practice tomato plants yield an average of 5-8 pounds per plant. Yields from 204 experimental plants in the greenhouse averaged 11 pounds, 5 ounces per plant.—The harvesting season was divided into 3 periods: 27% of the total yield was harvested during the 1st, 68% during the 2nd, and 5% during the 3rd period. With natural pollination the higher percentages are harvested in the later periods. Thus, hand pollination not only increases the total yield but it produces a higher percentage of early-maturing fruits.—*C. E. Owens*.

5901. JOGIRAJU, G. "**Donda**"—*Coccinia* (*Cephalandra*) *indica*. Jour. Madras Agric. Students Union 11: 82-83. 1923.—"Donda" is a rare vegetable which will bear fruits for 9 months in the year. Of the 2 varieties the long-fruited is more profitable. Propagation is by means of cuttings, the vines commencing to bear in 2 months. Details of cultivation are given.—*P. S. Jivanna Rao*.

5902. JOGIRAJU, G. **Some varieties of 'chikkudu' (runner bean).** Jour. Madras Agric. Students Union 11: 123-125. 1923.—Short descriptions with outline drawings are given of 14 varieties of the bean, *Dolichos Lablab*, which are brought under 2 groups—those with soft-skinned and those with tough-skinned fruits.—*P. S. Jivanna Rao*.

5903. WEIRUP. **Anbauversuche mit Erbsen im Jahre 1923.** [Culture tests with peas.] Mitteil. Deutsch. Landw. Ges. 38: 145-146. 1924.—Three varieties were tested at 5 stations; Brunonia gave highest yields but in quality was inferior to both the Moringia and Stofferts Neuzüchtung varieties.—*A. J. Pieters*.

5904. YEAGER, A. F. **Onion growing in North Dakota.** North Dakota Agric. Exp. Sta. Bull. 173. 1-12. 7 fig. 1924.—The crop is discussed under soil preparation, method of growing, varieties, time to seed, distance between rows, spacing, planting, cultivation, harvesting and curing, storing, and marketing. In eastern North Dakota, under good conditions, the onion crop should net \$300.00 an acre. Data indicate that North Dakota is not growing enough onions to supply local demand. Some of the varieties recommended are Red Wethersfield, Early Flat Red, Silverskin, and Yellow Globe Danvers.—*L. R. Waldron*.

### MORPHOLOGY, ANATOMY, AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 5744, 5751, 5868, 6011, 6160, 6230)

5905. ARBER, AGNES. **Leaves of the Gramineae.** Bot. Gaz. 76: 374-388. Pl. 28-30. 1923.—The grass leaf is interpreted as a phyllode consisting of a sheathing leaf base and a petiolar limb. The ontogeny of the grooved leaf was found to involve invagination. The author confirms the views of Bugnon that the prophyll represents a single leaf, the second bundle of which is interpreted as one of the main laterals, and that the scutellum and coleoptile together constitute a single bud leaf comparable with 1 of the bud leaves of a dicotyledon. The author considers the epiblast the equivalent of the auricles at the base of such a petiolate "pseudolamina" as that of *Sagittaria*. It is not at the proper level to be made the equivalent of the auricles in *Hordeum* (Celakovsky's view). The writer believes that "the awn of the lower palea and the scutellum of the cotyledon are equivalent to the limb of the foliage leaf, while

both the coleoptile and the part of the lower palea above the insertion of the arm are equivalent to the ligule of the foliage leaf."—*B. W. Wells.*

5906. ARTSCHWAGER, ERNST. On the anatomy of the sweet potato root, with notes on internal breakdown. *Jour. Agric. Res.* 27: 157-166. 4 pl. 1924.—The edible structure of the sweet potato is a thickened root. Its peculiar anomalous structure is due in part to the activity of a primary cambium, in part to the development of secondary cambiums and their products. The cells of the interstitial parenchyma of certain of the varieties break down in storage, causing the formation of large cavities lined with the cottony debris of the disintegrated tissue.—*Author.*

5907. CHIARUGI, A. Osservazioni anatomiche sopra i cosidetti stolon (stolofilli) di *Tulipa silvestris* L. [Anatomical studies on the "droppers" of *Tulipa silvestris*.] *Nuovo Gior. Bot. Ital.* 30: 172-200. 1923.—The "droppers" of *Tulipa silvestris* are hollow, stolon-like organs which contain a small bulb in their swollen tips. Each dropper constitutes the downward elongation of a leafbase fused on the adaxial side with the stem rudiment; it is therefore in part foliar, in part axial in origin. The vascular bundles of the dropper are arranged more or less asymmetrically in a circle. Those on the abaxial side of the dropper are derived directly from the bundles of the leafbase; those on the adaxial side are branches coming from the bundles going into the rudimentary stem. The apical region of the dropper has a zone of cells which contain statoliths. Immediately behind the apex is a meristematic zone from which growth in length takes place. The droppers are positively geotropic and negatively phototropic.—*Ernst Artschwager.*

5908. EDWARDS, J. G. Flower and seed of *Hedyosmum nutans*. *Bot. Gaz.* 70: 409-424. Pl. 34-36. 1920.—A detailed study of *Hedyosmum nutans* with regard to the structure and development of its flower and seed and a similar general study of *H. arborescens* show that these 2 subgenera of the genus are essentially alike. They represent the largest of the 3 subgenera of the genus *Hedyosmum* and may be regarded as characteristic of the genus as a whole. The structure and development of the reproductive organs of *Hedyosmum* are peculiar in the following respects: (1) The staminate flowers occur in long-stalked ovoid catkins; the pistillate, in sparsely flowered panicles. The occurrence of these 2 distinct types of inflorescence distinguishes the plants of the Chloranthaceae from those of the other 3 families of Piperales. (2) The flowers are unisexual. (3) The perianth is unlike any hitherto described but is not a primitive structure. The endosperm is cellular from the outset of its development, thus resembling that of the highly specialized dicotyledons. The peculiarity in the structure and development of the perianth and endosperm of *Hedyosmum* indicates that the structure and development of the gametophyte of angiosperms are not a satisfactory index of broader genetic relationships.—*Author.*

5909. JEFFREY, E. C., AND R. E. TORREY. Physiological and morphological correlations in herbaceous Angiosperms. *Bot. Gaz.* 71: 1-31. 7 pl., 4 fig. 1921.—This paper briefly reviews the idea that modern herbaceous stems are modified from woody ancestral types and then describes the physiological correlations that have accompanied these morphological transformations. In the semi-herbaceous species of *Aster* and *Helianthus* the relation of foliar rays to storage of synthates is explained. Emphasis is laid on the fact that there is a tendency to obliterate cambial activity in the cauline portion of the leaf trace. (Examples cited are: *Phaseolus*, *Papaver*, *Convolvulus*, *Clematis*, *Actaea*, and *Ranunculus*.) In its extreme expression this leads to the complete loss of cambium in the monocots, the conducting system of which is little more than a set of physiologically efficient leaf traces. Along with decrease in secondary growth has proceeded a tendency to multiply leaf traces, and the resulting crowding has been followed by fusion by the phloem faces and by the appearance of the amphivasal bundle condition. Such a state is seen in its incipency in the large-leaved *Sanicula* or in *Rumex* and it is highly characteristic of the nodes of the Gramineae or Juncaceae and of the rhizomes of monocots generally.—The authors point out that the root of herbaceous and of semi-herbaceous plants also offers anatomical and physiological correlations. In certain plants (e.g., *Aster umbellatus*, and *A. tartaricus*) the root cambium has disappeared and root hairs persist for several years in functional activity.—*R. E. Torrey.*



5910. JIVANNA RAO, P. S. Stomata in cotton flower. Jour. Madras Agric. Student 3. Union 11: 40-42. 1923.—The author found stomata in the epicalyx, calyx, anther surface, epidermis of the ovary, style, non-hairy portion of the stigma, and ovules of the cotton plant (*Gossypium herbaceum*). The guard cells contained starch in all cases.—*Author*.

5911. PFEIFFER, H. Beiträge zur Kenntnis der anomalen Dickenzuwachserscheinungen bei Liliaceen. [Contributions on anomalous growth in the Liliaceae.] Bot. Archiv 3: 129-134. 1923.—Although it is the pericycle which in *Chenopodium* gives rise to the meristem layer from which increase in thickness results, in the Liliaceae the secondary meristem arises outside the pericycle in tissue which topographically corresponds to the "rind".—*William Seifriz*.

5912. TOUMÉY, J. W. Multiple pine embryos. Bot. Gaz. 76: 426. 1 fig. 1923.—This is a note recording the appearance of 2 normal seedlings from a single seed of *Pinus Thunbergii*.—*B. W. Wells*.

5913. WEISSE, A. Blattstellungsstudien an *Cercidophyllum japonicum*. I. Die normale Blattstellung der vegetativen Sprosse. [The normal leaf position of vegetative shoots of *Cercidophyllum japonicum*.] Ber. Deutsch. Bot. Ges. 41: 374-378. 1923.—The author gives a detailed description of the development of the vegetative shoot of *C. japonicum* S. during the year.—*Hally Jolivet Sar.*

5914. WEISSE, A. Blattstellungsstudien an *Cercidophyllum japonicum*. II. Die Blüten-sprosse. [The flower shoots of *Cercidophyllum japonicum*.] Ber. Deutsch. Bot. Ges. 41: 381-385. 1923.—The author describes the development of male and female shoots of *C. japonicum* in detail and compares them morphologically and anatomically with the vegetative shoots.—*Hally Jolivet Sar.*

5915. ZIMMERMANN, A. Zur physiologischen Anatomie des trachealen Systemes. I. [Physiological anatomy of the tracheal system.] Ber. Deutsch. Bot. Ges. 41: 401-406. 1 fig. 1923.—The object of these experiments was to determine whether there are side connections between vascular bundles. By creating a considerable pressure difference between the longitudinal veins in the *Zea* leaf, the author found that there are such connections between the longitudinal strands. Using the woody stems of dicots, twigs of Linden, aspen, *Telfairia pedata* and *Salix babylonica*, he found that under sufficient pressure difference there is an indication of side connections. In general the connection between the separate bundles is affected by the bundles taking a more or less undulating course.—*Hally Jolivet Sar.*

## MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*

L. H. TIFFANY, *Assistant Editor*

(See also in this issue Entries 5753, 5756)

5916. DAHLGREN, ULRIC. The primitive luminous organisms of Maine. Maine Nat. 4: 16-23. 1924.—Bacteria and *Ceratium tripos* and *Noctiluca* are popularly discussed.—*J. R. Schramm*.

5917. DICK, J. Beiträge zur Kenntnis der Desmidiaceen-Flora von Süd-Bayern. [The Desmid flora of South Bavaria.] Bot. Archiv 3: 214-236. 7 pl. 1923.—The author lists the desmids collected from this region.—*William Seifriz*.

5918. GALTSOFF, P. S. Limnological observations in the upper Mississippi, 1921. Bull. U. S. Bur. Fish. 39: 347-438. 19 fig. 1923-24 (1924).—Hydrobiological investigations were made in the Mississippi River from Hastings, Minnesota, to Alexandria, Missouri, a distance of 465 miles. This included Lake Pepin, Lake St. Croix, the newly-formed Lake Keokuk, and the Rock Island Rapids. The plankton was most abundant in the lakes and least abundant in the rapids. The plankton content of the water entering the rapids was 4 times that of the water leaving them. A rise of water in the river diminished the quantity of plankton in the river and in the lakes into which it flowed. The families represented in the phytoplankton were Cyanophyceae, Bacillariaceae, and Chlorophyceae. Of the Cyanophyceae, *Clathrocystis aeruginosa* H., *Anabaena flos-aquae* Breb., and *Aphanizomenon flos-aquae* R. were most abundant. Of the Bacillariaceae, with the

exception of *Synedra delicatissima* W. S., the round diatoms were the only ones that were numerous. Of these, *Melosira crenulata* K., a filamentous form, seems to occur most often and in greatest quantity. Although this is a quiet-water species, more of it was found in the river than in the lakes. Although found in the channel of the river, it is likely that it developed in quiet water along the shore. Navicula, one of the most common genera, was represented by only 1 species, *N. confervacea* (K.) Gr. Nitzschia and Gomphonema, other very common genera, were not found. This cannot mean that they were not growing in the river, but only that they were not part of the plankton where observations were made. None of the Chlorophyceae were marked as abundant, but Desmidiium, Cosmarium, Spirogyra, Actinastrum, Scenedesmus, and Pedastrum were mentioned.—C. J. Elmore.

5919. GRONBLAD, ROLF. **Finnländische Desmidiaceen aus Keuru.** [Desmids of Keuru, Finland.] Acta Soc. Fauna et Flora Fennica 47<sup>4</sup>: 1-98. 6 pl. 1920.—The author presents a classification of the desmids of Keuru with descriptions of the species, and a bibliography from 1881-1917. The 23 genera comprise 315 species of which the following are new species, varieties, or forms: *Gonatozygon aculeatum* Hast. var. *gracile*; *Spirotaenia spirogyroides*; *Netrium digitus* (Ehr.) var. *rhomboideum*; *Closterium Braunii* Reinsch f. *sculpta* (Nordst.) nob.; *C. Brebissonii* Delp. var. *substriatum*; *C. costatum* Corda var. *Westii* Cushman f. *Klebsii* nob. (*C. striolatum* var. *costatum* apud Klebs); *C. Ehrenbergii* Menegh. f. *percrassa* nob.; *C. intermedium* Ralfs var. *erectum*; *C. Kützingii* Breb. var. *pseudopronum*; *C. lineatum* Ehr. var. *perporosum*; *C. lunula* (Müll.) var. *intermedium* Gutw. f. *Levanderi* nob.; *C. malinvernianiforme*; *C. Prichardianum* Argh. var. *subpraelongum*; *C. pseudanastomosum*; *C. pseudopenium*; *C. subjundiciforme*; *Pleurotaenia baculiforme*; *P. basiannulatum*; *P. nodosum* (Bail.) Lundell f. *Borgei* nob. (*P. nodosum* (Bail.) Lund apud Borge); *P. simplicissimum*; *Euastrum bipapillatum*; *E. ansatum* var. *quinquegemmatum*; *E. bidentatum* var. *pseudopictum*; *E. dubium* Nag. var. *Pseudocambrese*; *E. sinuosum* Lenorm. f. *elongatum*; *E. Turnerii* West. f. *fennica*; *E. verrucosum* Ehr. var. *perforatum*; *Micrasterius crux neblitensis* var. *protuberace*, var. *janeira* (Racib.) (*M. janeira* Racib.); *M. denticulata* Breb; *M. quadridentata* (Nordst); *M. pinnatifida* (Kütz) Ralfs, var. *pseudoscitans*; *M. radiata* Hass. var. *dichotoma*, var. *pseudocrux*; *M. thomasiana* Argh. var. *notata* (Nordst); *Cosmarium bisphaerum* var. *densegranulatum*; *C. identatum*; *C. minutum* (Ralf) var. *angustissimum*; *C. pachydermum* Lund. var. *heptagonum*; *C. pseudobinerve*; *C. sexscrobiculatum*; *C. subcoliferum*; *C. trinodulum* Nordst var. *insigne*; *Xanthidium cristatum* Breb. var. *dimazum*; *Straustraum acestrophorum* West var. *glabrius*, var. *subgenuinum*; *S. adornatum*; *S. affiniforme*; *S. asperatum*; *S. asterioideum* West. var. *ornatum*; *S. coniforme*; *S. connatum* Lund var. *pseudoamericanum*; *S. cyathodes* Josh. var. *keuruense*; *S. dejectum* Breb. var. *subglabrum*; *S. dimazum* (Lutkem.); *S. dimazum* var. *elegantius*; *S. fennicum*; *S. forficulatum* Lundell var. *verrucosum*, var. *subspinosum*, var. *heterocanthum*, var. *subheteroplophorum*; *S. grande* Bulnb. var. *angulosum*; *S. informe*; *S. iotatum* Wolle-West var. *perpendiculatum*; *S. longiradiatum*; *S. longirostratum*; *S. monticulosum* Breb. var. *groenlandicum*, var. *groenlandicum* f. *hastata*; *S. natator* West var. *Boldtii*, nob. (*S. paradoxus* fusiform Boldt var. *triquetrum*); *S. navigiolum*; *S. perundulatum*; *S. paradoxum* Meyen var. *longipes* Nordst f. *glabrium*; *S. pseudonum*; *S. pseudopisciforme* f. *dimidio-minor*; *S. senarium* var. *pseudowallichii*; *S. Simonyi* var. *elegantius*; *S. subfennicum*; *S. suboscelense*; *S. vestitum* Ralfs var. *splendidum*; *S. zoniferum*; *Sphaeroszoma vertebratum* (Breb.) var. *crassum*, var. *depressum* Hyalotheca dissiliense (Smith) var. *tridentula* f. *minima*; *H. nidica* Turn. var. *sparsipunctata*; *Desmidiium asymmetricum*.—Olga Lakela.

5920. HÉRIBAUD, JOSEPH. **Les Diatomées des Travertins d'Auvergne.** [Diatoms from the Travertines of the Auvergne district.] Ann. Biol. Lacustre 10: 5-203. 7 pl. 1921.—These lists of Diatoms were compiled by Héribaude with the collaboration of Aspetitia, Comère, Deblock, Ostrup, Peragallo, Prudent and d'Aubert from more than 50 different localities in the Auvergne district. Altogether 789 species or varieties are recorded from the deposits, of which 235 are new for the district and 167 are described for the first time, and a new genus, *Sigma* Peragallo is proposed. The new forms include *Achnanthes Aubertii* Hérib., *A. Bacillum* M. Per., *A. Delpirovi* M. Per., *A. fossilis* M. Per., *A. lanceolata* var. *maxima* M. Per., *A. Lancetula* E. Ost., *A. Leveillei* Hérib., *A. Martyi* Hérib., *A. PAGESI* M. Per., *A. pseudoantique* M. Per., *Amphiprora Rieufti* Hérib., *Amphora acutiuscula* var. *neglecta* R. d'Aub., *A. Athanasii* M. Per.,



*A. Berriati* Hérib., *A. Berriati* var. *minor* R. d'Aub., *A. fluminensis* var. *curta* R. d'Aub., *A. ovalis* var. *elongata* E. Ost., *A. Prudentii* Hérib., *A. salina* var. *capitata* M. Per., *A. Sancte-Nectairensis* R. d'Aub., *A. Sancti-Martialis* M. Per., *Cocconeis Grosii* Hérib., *C. Ostrupii* Hérib., *Coscinodiscus travertinorum* R. d'Aub., *Cymbella cistula* f. *abnormis* E. Ost., *C. cistula* var. *maculata* f. *subrecta* E. Ost., *C. Couderti* Hérib., *C. cymbiformis* var. *consimilis* R. d'Aub., *C. Deblockii* Hérib., *C. gallica* var. *calcareo* R. d'Aub., *C. gallica* var. *crassa* R. d'Aub., *C. gallica* var. *curta* R. d'Aub., *C. gastroides* var. *volvicense* M. Per., *C. helvetica* var. *signata* M. Per., *C. norvegica* var. *minor* R. d'Aub., *C. Sanctae Margaritae* M. Per., *Diploneis interrupta* var. *fossilis* M. Per., *D. interrupta* var. *major* M. Per., *Epithemia Aspeitiana* Hérib., *E. Aspeitiana* var. *dilatata* E. Ost., *Fragillaria Bacillum* M. Per., *F. Zellerii* f. *anomala* E. Ost., *Gomphonema dubravicense* var. *gallica* M. Per., *G. gracile* var. *naviculoides* E. Ost., *G. parvulum* var. *curta* R. d'Aub., *G. Sancte Floretense* E. Ost., *G. Sancte Nectairensis* R. d'Aub., *Hantzschia amphioxys* var. *arverna* M. Per., *H. amphioxys* var. *crassa* M. Per., *H. amphioxys* var. *hispida* M. Per., *H. amphioxys* var. *royatense* E. Ost., *Mastogloia elliptica* var. *punctata* Cleve, *Melosira Ostrupii* Hérib., *M. spinuligera* M. Per., *M. spinuligera* var. *spinosissima* M. Per., *Meridion Heribaudii* M. Per., *Navicula alpestris* var. *minima* R. d'Aub., *N. ambigua* var. *capitata* E. Ostr., *N. appendiculata* var. *brevis* R. d'Aub., *N. Aubertii* Hérib., *N. Blotii* Hérib., *N. Brebissonii* var. *attenuata* M. Per., *N. Brebissonii* var. *intermedia* M. Per., *N. Brebissonii* var. *lanceolata* E. Ost., *N. Chassagnei* Hérib., *N. cincta* var. *stricta* R. d'Aub., *N. claromontensis* Hérib., *N. Colii* Hérib., *N. Comerei* Hérib., *N. cuspidata* var. *minima* Comère, *N. Dactylus* var. *minor* Comère, *N. debilitata* M. Per., *N. Deblockii* M. Per., *N. Delpirouii* M. Per., *N. fasciata* var. *gigantea* M. Per., *N. fasciata* var. *marcata* E. Ost., *N. Gasilidei* M. Per., *N. Gasilidei* var. *major* M. Per., *N. Gasilidei* var. *minor* M. Per., *N. gomphonemacea* E. Ost., *N. halophila* var. *arvernense* R. d'Aub., *N. halophila* var. *gallica* E. Ost., *N. halophila* var. *minuta* R. d'Aub., *N. halophila* var. *obscura* R. d'Aub., *N. hemiviridula* M. Per., *N. Hyrtlyi* var. *linearis* E. Ost., *N. limanense* E. Ost., *N. limosa* var. *maculata* M. Per., *N. major* var. *Berriati* Hérib., *N. major* var. *latefasciata* E. Ost., *N. major* var. *Pagesi* Hérib., *N. megaloptera* var. *densecostata* R. d'Aub., *N. Menisculus* var. *inconspicua* R. d'Aub., *N. mutica* var. *capitata* E. Ost., *N. mutica* var. *entoleia* E. Ost., *N. mutica* var. *lucida* M. Per., *N. nodosa* var. *arverna* M. Per., *N. northumbri-caeformis* M. Per., *N. notata* var. *imperfecta* R. d'Aub., *N. notata* var. *minor* R. d'Aub., *N. oblonga* var. *alternans* M. Per., *N. oblonga* var. *curta* M. Per., *N. oblonga* var. *Gasilidei* M. Per., *N. Ostrupii* Hérib., *N. sculpta* var. *gigantea* M. Per., *N. sculpta* var. *minor* M. Per., *N. Sennenii* M. Per., *N. silicula* var. *trunculata* Grun., *N. sphaerophora* var. *obtusa* M. Per., *N. sphaerophora* var. *Schmidtii* M. Per., *N. Tambourense* M. Per., *N. ventricosa* var. *arverna* R. d'Aub., *N. ventricosa* var. *bacillaris* M. Per., *N. ventricosa* var. *laevis* M. Per., *Nitzschia bilobata* var. *fossilis* M. Per., *N. Couderti* Hérib., *N. dubia* var. *minor* M. Per., *N. gentilis* R. d'Aub., *N. gentilis* var. *elliptica* R. d'Aub., *N. Heusleriana* var. *major* M. Per., *N. Kittlii* var. *minor* E. Ost., *N. rugosa* E. Ost., *N. Stoliczkiana* var. *arverna* M. Per., *N. Tryblionella* var. *gigantea* M. Per., *N. vitrea* var. *gallica* f. *fossilis* M. Per., *N. vitrea* var. *scintillans* M. Per., *Rhopalodia Aubertii* Hérib., *R. Berriati* Hérib., *R. Charbonellii* Hérib., *R. Heribaudii* M. Per., *R. Musculus* var. *capitata* M. Per., *Scoliopleura gallica* M. Per., *S. travertinorum* R. d'Aub., *Sigma radiata* M. Per., *Stauroneis anceps* var. *crassa* E. Ost., *Stauroneis anceps* var. *hyalina* f. *crassa* E. Ost., *S. Glangeaudi* Hérib., *S. Hyi* Hérib., *S. incurvata* R. d'Aub., *Surirella Aubertii* Hérib., *S. Chassagnei* Hérib., *S. cordiformis* E. Ostr., *S. Couderti* Hérib., *S. Couderti* var. *minor* M. Per., *S. linearis* var. *minor* f. *constricta* M. Per., *S. ovalis* var. *cuneata* M. Per., *S. ovalis* var. *elongata* M. Per., *S. ovalis* var. *fossilis* M. Per., *S. ovalis* var. *linearis* M. Per., *S. ovalis* var. *torta* M. Per., *S. ovalis* var. *punctissima* E. Ost., *S. Sancte Nectairensis* R. d'Aub., *Synedra acus* var. *fossilis* f. *anomala* M. Per., *S. affinis* forma *anomala* M. Per., *S. affinis* var. *thermalis* M. Per., *S. affinis* var. *travertinorum* E. Ost., *S. angusta* E. Ost., *S. minuscula* var. *latistriata* E. Ost., *S. minuscula* var. *undulata* M. Per., *S. ulna* var. *calcareo* R. d'Aub., *S. ulna* var. *curta* M. Per., *S. ulna* var. *subcontracta* E. Ost.—*N. Carter*.

5921. HERRIOTT, E. M. Some morphological notes on the New Zealand giant kelp, *Durvillea antarctica* (Chamisso) [Hariot]. Trans. and Proc. New Zealand Inst. 54: 549-564. Pl. 54, 55, 21 fig. 1923.—The synonymy, general characters, distribution and habitat are described. The holdfast may reach a diameter of 60 cm. The stipe increases in thickness from

year to year up to as much as 12.5 cm., and consists of an assimilatory layer, a filamentous conducting tissue and a central tissue. The lamina is palmately segmented. In the older segments the central tissue is ruptured and inflated. Some indication of air chambers is usually present; the gas in these chambers was 22.54% oxygen and 77.45% nitrogen. The conceptacles occur thickly on the frond segments and are in best condition in winter. No hairs protruded from the ostioles; the plant is dioecious and 4 oospores are produced from a mother cell. "Buds" may be formed on the surface of the frond and one frond showed extreme filiform segmentation.—The bearing of this plant on Church's transmigration theory is discussed.—*Wm. Randolph Taylor.*

5922. KRASSKE, GEORG. Die Diatomeen des Casseler Beckens und seiner Randgebirge, nebst einigen wichtigen Funden aus Niederhessen. [Diatoms of the Cassel basin and surrounding hills, together with several important finds from Lower Hessen.] Bot. Archiv 3: 185–209. 14 fig. 1923.—The author presents critical notes on the occurrence and distribution of diatoms in the neighborhood of Cassel.—*William Seifriz.*

5923. NAUMANN, EINAR. Notizen zur Biologie der Süßwasseralgen. II. [Biological notes on fresh water algae.] Arkiv för Bot. 18<sup>21</sup>: 1–8. 1 pl., 4 fig. 1924.—*Paracapsa siderophila* is described as a new species and genus. It has been found on pieces of iron ore in a lake in the Aneboda-district of south Sweden. It forms a layer of papillae on the surface of the ore. These papillae are built up of more or less spherical cells arranged in radial rows surrounded by a mucilaginous layer. This layer is richly incrustated with iron hydrate. This new species belongs to the Chroococaceae and comes nearest to the genus *Entophysalis*. It contributes to the secondary growth of ore pieces that have arisen in some other way and also forms layers of iron ore on stones and rocks.—*O. Heilborn.*

5924. NAUMANN, EINAR. Notizen zur Systematik der Süßwasseralgen. VI–IX. [Taxonomical notes on fresh water algae.] Arkiv för Bot. 18<sup>20</sup>: 1–8. 7 fig. 1924.—The following new species are described from the Aneboda-district of south Sweden: *Rhizochrysis gracillima*, *R. polymorpha*, *R. major*, *Chromulina gigantea*, *C. nannos*, *Mallomonas pauciseta* and *Characium gracile*. The last mentioned species lives as an epiphyte on *Daphnia longispina* and is propagated by zoospores. The cilia-bearing pole of the zoospores is thigmotactically sensitive. Hence, the zoospores are fastened by this pole upon crusts of *Daphnia*, and may sometimes be fastened together forming colonies.—*O. Heilborn.*

5925. PALM, B. The geographical distribution of *Rhodochytrium*. Arkiv för Bot. 18<sup>16</sup>: 1–8. 1923.—*Rhodochytrium spelanthis* Lagerh., previously known from Ecuador and North America, was collected by the author at several places in the U. S. A. on *Ambrosia artemisifolia* and once on a *Solidago* species, the latter being a new host. On the coastal plain and on the central plateau of eastern Sumatra the author found the alga on *Spilanthes acmella*, *S. pseudacmella* and *Ageratum conyzoides*. In Sumatra zoosporangia and resting cysts were always found together in both dry and rainy seasons—no signs of any seasonal variation in the life history of the parasite being found. The alga has probably been introduced with its host plants from South America. Weeds, introduced to Dutch East Indies from South America, are generally free from parasitic fungi and galls. *Rhodochytrium*, however, is likely to be introduced with the host plants because it sometimes occurs in the inflorescence and even in the walls of the achenes, without causing noticeable injury.—*O. Heilborn.*

5926. SCHULZ, PAUL. Desmidiaceen aus dem Gebiete der Freien Stadt Danzig und dem benachbarten Pomerellen. [Desmidiaceae from the neighborhood of Danzig.] Bot. Archiv 2: 113–173. 101 fig. 1922.

5927. SCHULZ, PAUL. Kurzer Beitrag zur Kenntnis der Gattung *Tetraspora*. [Contributions to the genus *Tetraspora*.] Bot. Archiv 3: 314–316. 2 fig. 1923.—A species of *Tetraspora*, which is near the alga *Tetraspora lacustris* Lemm., is described. The author believes that the species is new and suggests the name *T. pseudovolvox*.—*William Seifriz.*

5928. STEINECKE, FR. *Actidesmium globosum*, eine neue Characiacee. [Actidesmium globosum, a new form of Characiaceae.] Bot. Archiv 3: 316–317. 3 fig. 1923.—The author suggests that this new species is sufficiently different from *A. Hookeri* to warrant placing it in a new genus. The habitat is in pools of moors.—*William Seifriz.*

5929. STEINECKE, FR. Das Phytoplankton masurischer Seentypen. [The phytoplankton



of the Masuren lakes.] Bot. Archiv 3: 209-213. Fig. 1-2. 1923.—The author lists and briefly discusses the plant forms found in the plankton of 32 lakes in the region of Neidenburg, East Prussia.—William Seifriz.

5930. STEINECKE, FR. *Microchaete spirulina*, ein neue Nostocacee. [*Microchaete spirulina* n. sp.] Bot. Archiv 3: 272. 1 fig. 1923.—This new species is close to *M. Goeppertiana*.—William Seifriz.

5931. STICKLAND, J. Excursion to Heidelberg. Victoria Nat. 40: 124-125. 1923.—Algae collected are mentioned.—Wm. Randolph Taylor.

5932. STRÖM, K. M. Snow algae (Cryoplankton) from the Sarek Mountains. Naturwissensch. Untersuch. Sarekebirges Schwedisch-Lappland Vol. 3. 522-524. 1923.—The red-snow organism, *Chlamydomonas nivalis*, (Bauer) Wille is very common in some districts. Other algae are remarkably scarce in snow samples, but include *Chionaster nivalis* (Bohl) Wille, *Stigonema* sp.?, and *Ulothrix flaccida* Ktz.—Wm. Randolph Taylor.

5933. STRÖM, K. M. The alga-flora of the Sarek Mountains. Naturwissensch. Untersuch. Sarekebirges Schwedisch-Lappland Vol. 3. 437-521. Pl. 12-16, 7 fig. 1923.—This paper, based on the collections of Lemmermann, Hamberg, Odhner, Bergström, von Hofsten, Alm, and Skottsberg, deals with the algae exclusive of diatoms. The systematic account lists 1 member of the Rhodophyceae, 38 Myxophyceae, 4 Flagellatae, 7 Peridineae and 274 Chlorophyceae, with collection data and occasional morphological notes. *Cosmarium excavatum* Nordst. var. *horizontale* (Schmidle) n. comb., *C. tetraophthalmum* Brev. var. *pyramidatum* n. var., *Staurostrum Hambergii* n. sp. are offered as new.—The flora is rich, considering the elevation and latitude, offering many new records for Sweden. Although somewhat poorer than in the lowlands, the flora is not notably different at high altitudes up to a level somewhat above the birch limit, where the Arctic species become added to the common species from the lower levels. Lists of algae in typical situations are given. In pools and among mosses desmids are notable. In streams attached to rocks are found *Tribonema bombycinum*, *Hydrurus foetidus*, *Prasiola fluviatilis*, *Dichothrix Orsiniana* and *Zygnema*, but not *Cladophora* as would be expected at lower levels. Along lake shores *Rhizoclonium hieroglyphicum*, and *Batrachospermum vagum* var. *keratophyllum* are notable.—The plankton algae of the lakes of the Sarek district indicate a Caledonian type, but poorer than the British, inclining toward the Arctic phase of this type.—The plankton of Vassijaure, Torne Träsk and Katterjaure is discussed; it consists largely of desmids.—The periodicity of the Vassijaure plankton, including the zooplankton, is discussed with graphs of the periodicity of notable forms. *Staurostrum granulosum* var. *Borgei* is offered as a new variety.—Wm. Randolph Taylor.

## MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entries 5685, 5700, 5721, 6231)

5934. AMANN, J. *Le Didymodon Ehrenbergii* (Lor.) Broth. en Suisse. [*Didymodon Ehrenbergii* in Switzerland.] Rev. Bryologique 51: 5-10. 1924.—The author reports a new Swiss station for *Didymodon Ehrenbergii* and discusses the distinctive features of this so-called species. He reaches the conclusion that it represents a variety or subspecies of the polymorphous *D. tophaceus*.—A. W. Evans.

5935. HUSNOT, T. À propos du *Pleuroschisma trilobatum* fructifié. [*Pleuroschisma trilobatum* in fruit.] Rev. Bryologique 51: 14-15. 1924.—According to statements in the literature fruiting specimens of *Pleuroschisma trilobatum* were unknown in France until very recently. The author corrects these statements and shows that Mougeot collected plants with capsules in the Vosges Mountains many years ago.—A. W. Evans.

5936. PEARSON, W. H. Note on *Jungermannia humilis*. Kew Bull. Miscell. Inform. 1922: 248-253. 4 fig. 1922.—The original material of *J. humilis* Hook. f. & Tayl. is in the Kew Herbarium and was collected by J. D. Hooker in 1846 on Kerguelen Island. In the author's opinion this material should not be referred to the genus *Lophocolea*, as was done by Stephani;

it represents instead a species of *Leioscyphus* and should be known as *Leioscyphus humilis* (Hook. f. & Tayl.) Pears. Three other specimens in the Kew Herbarium, preserved under the name *Lophocolea humilis*, represent 3 distinct species, all proposed as new by the author. They are as follows: *Conoscyphus flaccidus*, collected by A. Cunningham at Punta Arenas, Straits of Magellan; *Leioscyphus patagonicus*, collected by P. Dusén in Molyneux Sound, Patagonia; and *Lophocolea subretusa*, collected by Cunningham on the Thyssen Islands.—A. W. Evans.

5937. POTIER DE LA VARDE, R. Musci madurenses. [Mosses of Madura.] Rev. Bryologie 51: 10–14. 19 fig. 1924.—This is the 4th and last installment of the author's paper on the mosses of Madura, India. It lists 8 species, the following being described as new: *Oxyrrhynchium ovatum*, *Raphidostegium Sebillei* Broth. & Thér., *Scmatophyllum subleptocarpum* Thér. & P. de la V., and *Vesicularia nitidula*. In a short supplement a few errors are corrected and a few descriptions amplified, while another species, *Isopterygium subleptotapes*, is proposed as new. Unless otherwise noted Cardot and Potier de la Varde are the authorities for the new names. The figures illustrate new species proposed here and in the previous installment. [See also Bot. Absts. 12, Entry 3385; 13, Entries 285, 3604.]—A. W. Evans.

## MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

D. S. WELCH, *Assistant Editor*

(See also in this issue Entries 5693, 5717, 5821, 5823, 5925, 6018, 6020, 6021, 6023, 6026, 6027, 6028, 6036, 6039, 6088, 6104, 6144, 6170, 6180, 6201, 6211, 6226, 6243, 6252, 6337)

### FUNGI

5938. ANONYMOUS. [Rev. of: GAUMOUN, E. Beiträge zu einer Monographie der Gattung *Peronospora* Corda. Beiträge zur Kryptogamenflora der Schweiz. (*Peronospora* Corda. Contributions to the cryptogamic flora of Switzerland.) 5<sup>4</sup>: 360 p. Gebr. Fretz: Zurich, 1923 (see Bot. Absts., 13, Entry 986).] Rev. Gen. Bot. 35: 479–480. 1923.

5939. ARNAUD, G. Sur un champignon parasite des branches de poirier: le *Dermatea corticola* n. sp. [A fungus parasite on branches of pear: *D. corticola* n. sp.] Rev. Path. et Entomol. Agric. 10: 303–307. 1 fig. 1923.—The name, *Dermatea corticola* n. sp., is suggested for the ascigerous stage of the pycnidium-forming fungus, *Myxosporium corticolum*, known to cause a superficial canker on pear. The asci of the newly discovered perfect stage are 8-spored and measure 150 x 22  $\mu$ . The spores measure 29.5 x 9  $\mu$  and ultimately become 3 to 4 times transversely septate.—J. Dufrenoy.

5940. BATAILLE, F. Sur les descriptions de Quélet à propos des *Boletus sphaerocephalus* et *sulfureus*. [Quélet's descriptions of *B. sphaerocephalus* and *B. sulphureus*.] Bull. Trimest. Soc. Mycol. France 38: 167–169. 1922.—Evidence is given showing that these two species are distinct.—D. S. Welch.

5941. BOSE, S. R. Une Polyporacée nouvelle du Bengale. [A polypore new to Bengal.] Bull. Trimest. Soc. Mycol. France 38: 173. 1922.—*Trametes cincta* n. sp. on trunk of *Artocarpus integrifolia*.—D. S. Welch.

5942. BOURDOT, H., ET A. GALZIN. Hyménomycètes de France (VIII. Hymenochaete). Bull. Trimest. Soc. Mycol. France 38: 179–185. 1922.—Seven species of *Hymenochaete* are described and separated by a key.—D. S. Welch.

5943. BRACHER, ROSE. Notes on *Rhytisma acerinum* and *Rhytisma pseudoplatani*. Trans. British Mycol. Soc. 9: 183–186. Pl. 7. 1924.—Several comparative observations relating to the general life histories of *Rhytisma acerinum* from the United States and *R. Pseudoplatani* from England are recorded.—W. B. McDougall.

5944. CAHEN, EDMOND. Notes mycologiques sur l'Autriche. [Austrian mycological notes.] Bull. Trimest. Soc. Mycol. France 38: 176–178. 1922.—Fungi have become an important economic factor in this stricken country. The author visited several Austrian



mycologists and concludes his article with an appeal to the French scientific people to give some material aid to their unfortunate colleagues.—*D. S. Welch.*

5945. CARINI, A. Sur la dermatite verruqueuse. [Verrucose dermatitis.] Bull. Soc. Path. Exotique 17: 227-233. 1 pl., 3 fig. 1924.—The causal agent isolated from a case of this disease of man in Brazil seems to correspond to *Phyalophora verrucosa*. The effects of this fungus and of *Acrotheca* sp. are regarded as clinically the same.—*Philip Brierley.*

5946. CHAUVIN, E. *Amanita citrina* Sch. (= *Mappa* Fr.) et sa variété alba Pine ne paraissent pas vénéneuses. [*Amanita citrina* Sch. (*A. Mappa* Fr.) and its variety alba Pine appear not to be poisonous.] Bull. Trimest. Soc. Mycol. France 38: 200-206. 1922.

5947. CORFEC, P. Flore mycologique de la Mayenne (suite). [Mycological flora of Mayenne (continued).] Bull. Mayenne Sci. 1921: 91-96. 2 fig. 1921. Ibid 1922: 58-70. 1 fig. 1922.—A dichotomous key to the ochre-spored Agaricaceae found in Mayenne is given, together with brief descriptions of species and notes on their occurrence and habitat.—*M. Denis.*

5948. CUNNINGHAM, G. H. The Uredinales or rust fungi of New Zealand.—Part 1: Pucciniaceae-Tribe Puccineae. (Containing descriptions and illustrations of seventy five species.) Trans. and Proc. New Zealand Inst. 54: 619-704. Pl. 77, 76 fig. 1923.—A general discussion of the biology, hosts, cytology and distribution is given, with a key to the families, tribes and genera.—The new species described are:—*Uromyces otakou* on *Poa caespitosa* Spreng.; *U. Discariae* on *Discaria toumatou* Raoul; *Puccinia Kirkii* on *Rumex neglectus* T. Kirk and *R. flexuosus* Sol.; *P. tiritea* on *Mühlenbeckia australis* (Forst. f.) Meisson, and *M. complexa* (A. Cunn.) Meisson.; *P. contegens* on *Ranunculus lappaceus* Smith, and *R. multiscapus* Hook. f.; *P. inornata* on *Cardamine heterophylla* (Forst. f.) O. E. Schultz; *P. Reidii* on *Radicula* sp. ined.; *P. Hoheriae* on *Hoheria populnea* A. Cunn.; *P. Halorrhagidis* on *Halorrhagis depressa* (A. Cunn.) Walp. and *H. erecta* (Murr.) Schindler; *P. cuniculi* on *Angelica Gingidium* Hook. f.; *P. Kopoti* on *Anisotome aromatica* Hook. f.; *P. Oreomyrrhidis* on *Oreomyrrhis andicola* Endl.; *P. Cockaynei* on *Gentiana corymbifera* T. Kirk and *G. Griesbachii* Hook. f.; *P. tararua* on *Gentiana patula* Cheesm.; *P. pedatissima* on *Ourisia macrophylla* Hook.; *P. Allanii* on *Senecio lagopus* Raoul; *P. Atkinsoni* on *Olearia ecorticata* Buch.; *P. egmontensis* on *Celmisia glandulosa* Hook. f.; *P. fodiens* on *Celmisia rigida* (T. Kirk) Cockayne; *P. hectorensis* on *Senecio Bidwillii* Hook. f.; *P. novae-zelandiae* on *Olearia Fosteri* Hook. f.; *P. pounamu* on *Senecio southlandicus* Cockayne.—*Wm. Randolph Taylor.*

5949. DIEUZAIDE, R. Les rapports entre les champignons et les insectes. [The relation of fungi to insects.] Rev. Zool. Agric. et Appl. 22: 282-289. 1923.—A review of papers on saprophytic and symbiotic fungi recorded on insects is given.—*J. Dufrenoy.*

5950. DUMÉE, P. Notes de mycologie pratique (suite). [Notes on practical mycology (continued).] Bull. Trimest. Soc. Mycol. France 38: 188-199. Pl. 11. 1922.—*Cortinariu torvus* Fries, *C. varicolor* Pers., *C. solor* Fr., and *C. Berkeleyi* Cooke are forms of the same fungus. *Amanita solitaria* Bull. = *A. strobiliformis* Paul. *Tricholoma truncatum* Schaef. = *T. militare* Lasch. *Polyporus dryadeus* Pers. is figured and descriptive notes based on fresh material are given. The color reactions of *Tricholoma nudum* Bull. and *T. personatum* Fr. when treated with guaiacum are noted—the former turns a much deeper blue. *Tricholoma irinum* and *T. glauccanum* are compared. It is suggested that they be united.—*D. S. Welch.*

5951. ERIKSSON, JAKOB. Neue oder kritische Gras-Uredineen. [New or critical grass Uredineae.] Arkiv för Bot. 18<sup>o</sup>: 1-22. 1 pl., 7 fig. 1923.—*Puccinia Poae-alpinae* on *Poa alpina* is described as new. In infection experiments with uredospores of this species on *Poa pratensis* and *P. annua*, the former species was slightly attacked, the latter not at all. The new species stands very near to *P. Petasiti-Pulchellae* W. Lüdi. Infection experiments with *Puccinia Poarum* Niels. showed that there probably exist different races within this species of which one (f. sp. *pratensis*) attacks *Poa pratensis* while another (f. sp. *caesia*) attacks *Poa caesia* and *P. compressa*. Neither of these races attacks *P. annua*. *Uredo Avenae-pratensis* on *Avena pratensis* is described as new. It is well distinguished from *Uredo graminis* and *U. brenina* as shown by infection experiments on *Avena sativa* and *Bromus brisaeformis* which gave negative results. *Uredo Festucae-ovinae* on *Festuca ovina* and *U. Glyceriae-distantis* on *Glyceria distans* are described as new. A species of *Uredo* on *Avena flavescens*, similar to the *Uredo*-stage of *Puccinia Arrhenatheri*, is probably also new as shown

by infection experiments. Notes are further made on *Puccinia Mili* Eriks., *P. pygmaea* Eriks., *P. Baryi* (Berk. & Br.) Wint., *Uredo anthotanthina* Bub. and *U. Airae* Lagerh.—O Heilborn.

5952. ERIKSSON, JAKOB. Zur Kenntnis der schwedischen Phragmidium-Formen. [Swedish Phragmidium-forms.] Arkiv för Bot. 18<sup>is</sup>: 1-34. 1 pl., 6 fig. 1923.—The caecoma-stage of *Phragmidium subcorticium* (Schr.) Wint. appears in spring, uredo- and teleuto-spores appearing later. During some years the caecoma-stage alone was found on certain roses, e.g., 1881-83 in the neighbourhood of Stockholm, when teleuto- and uredo-spores were totally absent. In the rose-cultures observed by the author during these years, the fungus must thus have passed the winter as a mycelium in the interior of the stem, any new infection from without being excluded. This view is further supported by the fact that the fungus bursts forth in the spring on the lower parts of the stems and later ascends, finally appearing on the leaves. Observations by other authors are confirmatory. Infection experiments gave positive results when teleuto-spores were used, but negative results with aecidium- or uredo-spores. The experiments showed that there is in Sweden at least one specialized form, f. sp. *Rosae centifoliae*, which attacks *R. centifolia*, *R. gallica* and *R. hybrida* but not *R. pimpinellifolia* and *R. rubrifolia*.—Infection experiments with teleuto-spores of *Phragmidium Rubi-Idaei* (DC.) Karst. on *Rubus Idaeus* and *R. luciniatus* resulted in the production of the caecoma stage, whereas infection experiments with caecoma and uredo gave no result.—Infection experiments with *Phragmidium violaceum* (Schultz.) Wint. on several species of *Rubus* showed that while the teleuto-spores germinated well, their infecting capacity was very small. However, positive results were obtained in many cases, a caecoma-generation always being the result.—*Phragmidium Potentillae* (Pers.) Karst. was shown by infection experiments to attack several species of *Potentilla*.—O. Heilborn.

5953. FROMME, F. D. The rust of cowpeas. Phytopathology 14: 67-79. 1 pl. 1924.—The rust of cowpea (*Vigna* spp.) is found to differ morphologically and in host range from *Uromyces appendiculatus* (Pers.) Fries and is considered a distinct species identical with *Uromyces vignae* Barclay. It is here redescribed as *Nigredo vignae* (Barcl.) comb. nov. The principal morphological characters in which it differs from *Uromyces appendiculatus* are the grouping of the aecia, the position of the germ pores on the urediniospores, and the germination of the teliospores. In the urediniospores of *Nigredo vignae* the germ pores are superequatorial. The teliospores are capable of germinating immediately after maturity. Inoculations were made on several varieties of cowpeas and on closely related plants, but infections resulted on a few varieties of the Blackeye type only. Study of herbarium material has, however, shown that *Vigna repens*, *V. sesquipedalis*, *Phaseolus truxillensis*, and *Dolichos lablab* are also hosts for this species. The great majority of the cowpeas grown commercially in the United States are immune to rust.—B. B. Higgins.

5954. GRELET, L. J. Nouvelle note sur le *Cyphella leochroma* Bres. [An additional note on *Cyphella leochroma*.] Bull. Trimest. Soc. Mycol. France 38: 174. 1922.—The author believes that *C. leochroma* Bres. and *C. tephroleuca* Bres. may better be considered varieties of the same species and suggests *Cyphella Bresadolae* n. sp.—D. S. Welch.

5955. GRIGORAKI, L., ET PEJU. Étude de quelques espèces nouvelles de levures isolées de certains exsudats pathologiques de l'homme. [New species of yeast isolated from pathologic exudations of man.] Bull. Trimest. Soc. Mycol. France 38: 144-154. Pl. 6-7. 1922.—Mycological and physiological investigations have brought to light 2 new varieties of *Willia Anomala* (not named here) and 1 new species, *Debaryomyces Matruchoti*.—D. S. Welch.

5956. GRIGORAKI, L., ET PEJU. Quelques espèces nouvelles du genre *Torula*. [New species of *Torula*.] Bull. Trimest. Soc. Mycol. France 38: 155-165. Pl. 8-10. 1922.—The morphological and physiological characters of 9 new species of *Torula* are here presented. The forms are designated by number only.—D. S. Welch.

5957. HEIM, ROGER, ET G. MALENGON. Note sur la non-comestibilité de *Clavaria formosa* Pers. [Concerning the non-edibility of *Clavaria formosa*.] Bull. Trimest. Soc. France 38: 175. 1922.—Contrary to current opinion, this species is shown to have some poisonous properties.—D. S. Welch.



5958. JACZEWSKI, A. DE. Matériaux pour la flore mycologique de la Sibérie occidentale. [Material for the cryptogamic flora of western Siberia.] Bull. Trimest. Soc. Mycol. France 38: 207-210. 1922.—The author presents the work of Constantin Mouraschinski, who made studies on the following forms, growing them in pure culture. The species or varieties are all described as new; *Mycosphaerella halimodendri*, *Pleomassaria halimodendri*, *Hendersonia halimodendri*, *H. atragenes*, *Rhabdospora leptospora* (Massal.) Sacc. var. *atragenes* *Sibéricae*, *Septoria atragenes*, and *S. agropyri ramosi*.—D. S. Welch.

5959. KEISSLER, K. Einige interessante Flechtenparasiten aus dem Herbar Upsala. Some interesting parasites on lichens in the Upsala herbarium. Arkiv för Bot. 18<sup>16</sup>: 1-24. 1923.—The following species, varieties or combinations are new: *Physalospora Friesii* on thallus of *Leptogium* (?), *Didymella collematum* (Stein) Vou. var. *Cladoniae* on thallus of *Cladonia*, *Mullerella polyspora* Hepp. var. *hospitans* (*M. hospitans* Stitz.), *Ophiobolus barbarus* (*Segestria barbara* Fries), *Conida fuscopurpurea* (Tul.) Vouaux f. *peltigera* (*Scutula peltigera* (Fries) Rehm), *Leciographa inspersa* Rehm var. *convexa* (*L. convexa* (Fries) Oliv. = *L. homoica* (Nyl.) Arn.), *Diplodia Lecanorae* (*Sclerococcum Lecanorae* Vouaux), *Dicoccum trachylioides* (*Spilomium trachylioides* Nyl.), *Coniosporium pertusaricola* (*Spilomium pertusaricola* Nyl.), *Metasphaeria tartarina* (*Verrucaria tartarina* Nyl.).—Critical remarks are made on *Endococcus heterosporus* Norm. (*Müllerella haplotella* (Arn.) Nyl.), *Physalospora Xanthoriae* (Wedd.) Sacc., *Agyrium cephaladioides* Nyl. (probably = *Nesolechia oxyspora* Mass.), *Karschia Pertusariae* Vouaux.—Notes are made on and new localities given for *Pharcidia constrictella* Müll., *P. dispersa* Wint., *P. Schaereri* Arn., *P. superposita* (Nyl.) Sacc., *P. dealbens* (Müll.) Zopf., *Tichothecium pygmaeum* Korb. var. *fuscoatra* (Stein.) Vouaux, *T. nanellum* (Ohl.) Arn., *Phaeospora decolorans* Rehm, *Sphaerulina intermedia* Vouaux, *S. nephromiaria* (Linds.) Vouaux, *Physalospora Galactinae* Vouaux, *Didymella sphinctrinoides* Sacc. var. *lithoicae* (Bouly de Lesd.) Vouaux, *Didymosphaeria epicrassa* (Oliv.) Vouaux, *D. microstictica* (Leight) Wint., *D. Brycnthae* Wint. var. *stellulatae* Vouaux, *Metasphaeria lichenicola* (Zopf) Vouaux, *Leptosphaeria Crozalsi* Vouaux, *Leptosphaeria Crozalsi* Vouaux, *Pleospora rufescentis* Vouaux, *Ciliomyces oropensis* (Ces.) Hohn., *Agyrium flavescens* Rehm, *Celidium pulvinatum* Rehm, *Scutula Stereocaulorum* Körb., *Karschia rimulicola* Arn., *Nesolechia associata* (Fr.) Sacc. et D. Sacc., *Leciographa rhyparizae* (Arn.) Rehm, *Tryblidaria nivalis* (Bagl. et Car.) Rehm apud Sacc., *Coniothyrium Imbricariae* All., *Coniothecium lichenicola* Linds.—In addition notes are made on a lichenoid fungus, *Pragmopara bacilligera* (Karst.) Rehm and a list is given of the more important species dealt with in the text.—O. Heilborn.

5960. KILLIAN, CH. Etudes biologiques de genre *Ramularia* 1<sup>o</sup> partie *Ramularia Geranii* West (Fuck.) adoxae Rabenh. [Biological studies on *Ramularia*.] Rev. Path. Vég. et Entomol. Agric. 10: 277-303. 1923.—The composite species, *Ramularia Geranii*, is split on cultural characters into 3: *R. Geranii pusilli* (with grayish, rapidly growing colonies which blacken agar medium), *R. Geranii pyrrhannaici* (with white glabrous colonies which become fluffy but do not blacken the agar), and *R. Geranii silvatici* (with slow growing rose colored colonies slightly blackening the agar). Other cultural characters are given.—J. Dufrenoy.

5961. LAGARDE, J. Biospeologica XLVI. Champignons 3<sup>e</sup> série. [The biology of caves XLVI. Fungi.] Arch. de Zool. Expér. et Gén. 60: 593-625. 7 fig. 1920-22.—This work is a continuation of that which appeared in 1917 (Biospeologica XXXVIII). The fungi here described were collected in caves, located in various parts of southern Europe, which were explored during the years 1913 to 1917. The collections embrace representatives of all the larger groups of fungi. Brief descriptions of the species encountered are given, with notes relating to peculiarities in form or habitat.—D. S. Welch.

5962. LEMERCIER, R., ET A. L. LETACQ. Liste de champignons recueillis dans les bois de la Lande à Serans (20 juillet) et la forêt de Gouffern (25 septembre). [A list of fungi collected in the woods of La Lande at Serans (July 20) and in the forest of Gouffern (September 25).] Bull. Soc. Linn. Normandie VII, 5: 122-124. 1922.—This is a list of fungi collected in the woods of La Lande at Serans, Touxorè at Hesloup, and in the forest of Montgoubert at Saint Julien on Sarthe.—M. Denis.

5963. LETACQ, A. L. Liste de Champignons recueillis aux environs d'Alençon durant les mois de mars, avril et mai 1920. [List of fungi collected near Alençon during March, April and May, 1920.] Bull. Soc. Linn. Normandie VII, 3: 247-248. 1920.

5964. LETACQ, A. L. Observations mycologiques faites durant l'automne 1920, aux environs d'Alençon. [Mycological observations made during the autumn of 1920 in the vicinity of Alençon.] Bull. Soc. Linn. Normandie VII, 3: 307-312. 1920.

5965. LETACQ, A. L. Observations mycologiques faites en 1919 aux environs d'Alençon. [Mycological observations made in 1919 in the vicinity of Alençon.] Bull. Soc. Linn. Normandie VII, 2: 184-195. 1919.—This is a list of fungi.—*M. Denis*.

5966. LETACQ, A. L. Observations mycologiques faites en 1921 aux environs d'Alençon et dans le département de l'Orne. [Mycological observations made in 1921 near Alençon and in the province of Orne.]—Bull. Soc. Linn. Normandie VII, 4: 219-220. 1921.

5967. LETACQ, A. L. Observations mycologiques faites en 1922 dans le département de l'Orne et aux environs d'Alençon. [Mycological observations made in 1922 in the province of Orne and near Alençon.] Bull. Soc. Linn. Normandie VII, 5: 116-122. 1922.

5968. LETACQ, A. L. Superposition de deux Psalliotes. *Psalliota campestris*. [The superposition of two *Psalliotas*.] Bull. Soc. Linn. Normandie VII, 3: 253-254. 1920.—Two individuals of *Psalliota campestris* with superposed pilei are described.—*M. Denis*.

5969. MORQUER, R. Sur un nouvelle hôte du *Trametes hispida* (Bagl.) [A new host for *Trametes hispida*.] Bull. Trimest. Soc. Mycol. France 38: 170-172. 1922.—This fungus was found in the Botanical Garden at Toulouse growing upon *Schinus dependens* Orteg. (*Duvaia dependens* DC), has been hitherto unreported as a host for this fungus. Cultures of the organism were readily obtained by planting bits of diseased wood on various media.—*D. S. Welch*.

5970. OTA, MASAO ET MAURICE LANGERON. Nouvelle classifications des dermatophytes. [New classification of the dermatophytes.] Ann. Parasitol. Humaine et Comparée 1: 305-336. 1923.—Early students of the dermatophytes based generic distinctions largely upon clinical characters. The resulting genera were not genera in the true botanical sense. With a single exception these fungi are not known to produce perithecia and the authors do not feel justified in placing all these forms in the Gymnoascaceae. They are therefore to be considered as Hyphomycetes. Within this group the dermatophytes appear most closely allied to the family *Conidiopspiraceae* according to the classification of Vuillemin but they differ to such an extent that the authors propose for them a new sub-family, *Closterosporeae*. The species of the sub-family are grouped into 6 genera, 3 of which, *Sabouraudites*, *Bodinia* and *Grubyella* are new. The genus *Sabouraudites* is further divided into 3 new subgenera; *Aleurocloster*, *Closteramma* and *Aleuramma*. The single genus which has been said to form perithecia and probably asci is retained in the Gymnoascaceae as the new genus *Atel-eothylix*.—*D. S. Welch*.

5971. PATOULLARD, N. Une anomalie cantharelloïde de *Clitocybe dealbata* Fr. [A *Cantharellus*-like anomaly of *C. dealbata* Fr.] Bull. Trimest. Soc. Mycol. France 38: 186-187. 1 fig. 1922.—This unusual fructification characterized by an alteration from gills to irregular folds, reduction in size, and production of rose or dark red color, is placed in the group, *Phlebophora* Lév.—*D. S. Welch*.

5972. PEYRONEL, BENIAMINO. Champignons nouveaux des Vallées Vaudoises du Piémont. Première série. [New fungi from the Vaudois Valley of Piémont.] Bull. Trimest. Soc. Mycol. France 38: 140-143. Pl. 4-5. 1922.—The following are described as new; genus *Alysisporium* (*Sphaerioidaceae*), species, *A. rivoclarinum*; *Cytosporium melanommatoides*; genus *Chaetalysis* (*Leptostromataceae*), species, *C. myrioblephara*; *Clasterosporium hirudinoides*.—*D. S. Welch*.

5973. RAMSBOTTOM, J. A handbook of the larger British fungi. iv + 222 p., 141 fig. British Museum. Taylor and Francis: London, 1923.—This book seeks to supply an introduction to the study of the larger British fungi. The author has retained the form and arrangement of the "Guide to Sowerby's models of British fungi" by W. G. Smith and in addition, all the British genera of Basidiomycetes have been included, as well as figures from Smith's "Synopsis of British Basidiomycetes." The descriptions have been revised and enlarged, and additional matter of economic and biological interest has been included. In dealing



with the fleshy agarics, the basis of selection has been on edible or poisonous qualities of the species.—*D. S. Welch.*

5974. RICK, J. *Contributio ad monographiam Polyporacearum riograndensium.* [Contribution towards a monograph of the polypores of Rio Grande (do Sul, Brazil).] *Broteria Ser. Bot.* 21: 5-11. 1924.—The title is somewhat misleading, the article being mainly a list of species with habitats. Descriptive notes are given in the case of some 20 out of the 75 species listed and there are references to Lloyd: "Mycological Notes." The genera included are *Polyporus*, *Ganoderma*, *Pomes*, *Trametes*, *Daedalea*, *Polystictus*, *Rimbachia*, and *Laschia*.—*E. B. Chamberlain.*

5975. ROBERTSON, F. C. FORD. *Hormodendron olivaceum* (Corda) Bon. A new British record. *Trans. British Mycol. Soc.* 9: 187. 1 fig. 1924.—*Hormodendron olivaceum* was obtained in cultures made from mummied plums infected with *Sclerotinia* sp. The fungus had not been previously recorded in Britain but had been found on the continent growing on birch wood.—*W. B. McDougall.*

5976. SATIN, SOPHIE. Beiträge zur Kenntnis des Ascomyceten *Magnusia nitida* Sacc. I. Befruchtung und Entwicklungsgeschichte des Peritheciums; Nebenfruchtform des Pilzes. [Ascomycete *Magnusia nitida* Sacc. I. Fertilization and development of the perithecium and the imperfect form.] *Bot. Archiv* 3: 273-281. 1 pl., 15 fig. 1923.—Fertilization precedes the development of the perithecium. The contents of the antheridium flows into the oogonium after fusion with the trichogyne. Both nuclei divide without fusing. The oogonium becomes subdivided into parts, each of which is binucleate. In time this division stops, but the two nuclei continue dividing producing multinucleate portions, from which portions or cells arise the ascogenous hyphae with paired nuclei. The nuclei in the hook cells which form the asci fuse and the asci are then produced. The wall and the sterile tissue of the fruit body arise from the stalk cells and the vegetative hyphae. The appendages are of endogenous origin, from beneath the outer layers of the perithecial wall. Under certain nutrient conditions, in addition to the ascus form or in place of it, an imperfect stage develops which resembles the conidial form of *Penicillium*.—*William Seifriz.*

5977. TORREND, C. Les Polyporacées du Brésil. [Brazilian Polypores.] *Brotéria Sér. Bot.* 21: 12-42. 4 pl. 1924.—The present article covers the genera *Lignosus*, *Petaloides* (with the sections *Polyporoides* and *Polystictoides*), *Merisina*, and *Spongiosus*. Keys, and descriptions or descriptive notes for each species are given, and at the end of each genus the author lists those tropical species with which comparison might prove profitable. There are many references to figures in other works as well as critical comments and comparisons. *Petaloides pseudo-favolus* Torrend is proposed as new, and *P. melanopus* (Mont.) Torr., and *P. pusillus* (Fr.) Torr., are apparently new combinations. [See also *Bot. Absts.* 6, Entry 208; 8, Entry 1314; 12, Entry 2544].—*E. B. Chamberlain.*

5978. WAKEFIELD, ELSIE M. On the names *Sclerotinia sclerotiorum* (Lib.) Massee, and *S. libertiana* Fuckel. *Phytopathology* 14: 126-127. 1924.—The author maintains that, by reason of priority, *Sclerotinia sclerotiorum* (Lib.) Massee should be the accepted name of this fungus.—*B. B. Higgins.*

5979. [WAKEFIELD, ELSIE M.] The Bristol foray. *Trans. British Mycol. Soc.* 9: 129-133. 1924.—The spring foray, April 20-23, 1923, is reported with a complete list of the fungi collected. The list contains about 175 species of true fungi and 29 Myxomycetes.—*W. B. McDougall.*

5980. WILSON, MALCOLM. Observations on *Camarosporium abietis* n. sp. *Trans. British Mycol. Soc.* 9: 144-151. Pl. 3-4. 1924.—*Camarosporium abietis* n.sp. was found on a solitary tree of *Abies Lowiana*. The structure and relationship of the fungus as well as its complete life history are discussed in detail. The author believes the fungus to be saprophytic rather than parasitic but infection experiments are being carried on for the purpose of deciding this point.—*W. B. McDougall.*

5981. WILSON, MALCOLM. Observations on some Scottish Uredineae and Ustilagineae. *Tran. British Mycol. Soc.* 9: 135-144. 1924.—Brief notes on 20 species of rusts and 3 species of smuts are given.—*W. B. McDougall.*

## LICHENS

5982. SAMPAIO, GONÇALO. Contribuições para o estudo dos líquenes portugueses. [Contribution to the study of Portuguese lichens.] Ann. Acad. Polytechnica Porto 12: (1-15.) 1917 [1918].—The present paper lists 56 species or varieties which are recorded for the first time as members of the Portuguese flora. Each species is accompanied by a short description, with a few critical notes. The following species are proposed as new, the authority in all cases being Sampaio:—*Collema stenosporum*, *Collema anemoides*, *Lemnopsis affine*, *Arthonia algarbica*, *Rhinodina atrocinerella* var. *macrospora*, *Gyalecta decipiens*, *Lecidea populicola*, *Cladonia subturgida*. All are from various parts of Portugal. There are the following new combinations *Collema Harmandi* (*C. pulposum* Harm. non Nyl.), *Toninia sabulosa* (*Bilimbia*, Mass.), *T. albilabra* (*Lecidia*, Nyl.), *T. lurida* (*Thalloidima*, Bagl.), *Caloplaca Lallavei* (*Lecidea*, Clem.). It is noted that *Lecanora Lallavei* Samp. non Nyl., in Broteria 15: 136 is *Caloplaca percrocata* Jat.—E. B. Chamberlain.

5983. WATSON, W. The lichens of the Bristol foray. Trans. British Mycol. Soc. 9: 133-135. 1924.—A complete list of the lichens collected during the spring foray, April 20-23, 1923, is given. The list contains about 124 species.—W. B. McDougall.

## BACTERIA

5984. AYERS, S. HENRY, AND W. T. JOHNSON, JR. Relation of *Streptococcus fecalis* to *Streptococcus lactis*. Studies of the streptococci X. Jour. Infect. Diseases 34: 49-53. 1924.—*Streptococcus fecalis* isolated from human feces exhibited physiological and morphological characteristics similar to *Streptococcus lactis* of milk. The authors suggest that the two may be identical.—R. L. Starkey.

5985. AYERS, S. HENRY, W. T. JOHNSON, JR., AND C. S. MUDGE. Streptococci of souring milk with special reference to *Streptococcus lactis*. Studies of the streptococci IX. Jour. Infect. Diseases 34: 29-48. 1 fig. 1924.—A large percentage of the streptococci isolated from milk were varieties of *Streptococcus kefir*. The streptococci of the udder, feces, and mouth of the cow were in the minority. Most of the other streptococci isolated were varieties of *Streptococcus lactis*. In the more acid milk a higher percentage of varieties of *Streptococcus lactis* was present while the percentage of *Streptococcus kefir* was greater in milk of lower acidity. Neither of these organisms were of the types in the udder, feces, or mouth of cows.—R. L. Starkey.

5986. BACHMANN, FRED A. M., AND EDITH HAYNES. Presence of toxin producing anaerobes in Wisconsin. Jour. Infect. Diseases 34: 132-136. 1924.—Tests on 146 samples of soils, plants, and insects failed to indicate that *Clostridium botulinum* was present in the materials.—R. L. Starkey.

5987. BERGEY, DAVID H., FRANCES C. HARRISON, ROBERT S. BREED, BERNARD W. HAMMER, AND FRANK M. HUNTOON. Bergey's manual of determinative bacteriology. xii + 442 p. Williams & Wilkins Co.: Baltimore, 1923.—This is a key to the identification of organisms of the class Schizomycetes as arranged by the authors who constitute a committee of the Society of American Bacteriologists. The preface contains, in addition to a brief statement by the Committee, suggestions for the use of the Manual in classifying unknown organisms. Also in the introduction a brief review of previous attempts at classification is given, followed by the bacteriological code. The class Schizomycetes is divided into 6 orders and each order is again subdivided into family, tribe and genus. Over 970 organisms are classified into 94 genera, the type species being indicated for each genus. The genera *Streptococcus* Rosenbach, *Micrococcus* Cohn, *Pseudomonas* Migula, and *Salmonella* Lignères are emended. The genera *Flavobacterium*, *Achromobacter*, *Aliulomonas*, *Phytomonas* and *Dialister* are described as new. The tribes *Achromobactereae* and *Cellulomonadeae* are used for the first time in the Bacteriaceae. The following new names, new species, and new combinations appear; *Neisseria perflava* nom. nov., *N. subflava* nom. nov., *Streptococcus mixtos* nom. nov., *S. atenos* nom. nov., *Staphylococcus pharyngis* sp. nov., *Micrococcus subflavescens* sp. nov., *M. perflavus* sp. nov., *M. percitreus* sp. nov., *Sarcina lactea* sp. nov., *Corynebacter*



*terium bovis* sp. nov., *Serratia Miquelii* comb. nov., *Chromobacterium bamptonii* comb. nov., *Pseudomonas cyanogena* comb. nov., *Achromobacter sewerinii* comb. nov., *Encapsulatus Pfeifferi* comb. nov., *Dialister pneumosintes* comb. nov.—J. K. Wilson.

5988. BUC, E. Sur la relativité du caractère aérobie du Bacille tuberculeux. [The relativity of the aerobic character of the tuberculosis bacillus.] Compt. Rend. Soc. Biol. 88: 1135-1137. 1923.—Evidence is brought forward that the anaerobic rather than the aerobic form of *B. tuberculosis* is the normal form.—Oran Raber.

5989. BUCHNER, PAUL. Rassen- und Bacteroidenbildung bei Hemiptersymbionten. [Formation of races and bacteroids in Hemipter symbionts.] Biol. Centralbl. 42: 38-46. 1922.—The aspects of symbiosis here considered fall under the interesting phenomena where 2 or even 3 apparently specifically distinct microscopic symbionts live in association in the tissues of an insect host. The author brings forward results of his own extended researches in various families of Hemipters to indicate not only the very general occurrence in one form or another of the so-called symbiont organs (mycetomes) but also to present an historical review of the development of the phenomena of symbiosis in Hemiptera from which certain conclusions may be drawn. The original organisms are believed to be bacteria which on gaining entrance to the tissues of the host induce the formation of the special form of symbiont organ characteristic of each species or family of the group Hemiptera. Different stages and forms—bacilli, bacteroids, yeastlike cells—are modifications of or even mutations of the original infecting organism comparable, at least in some cases, to the transformations of *Bacillus radicola* when it gains entrance into the root hairs of legumes. Two of the commonest modifications are (1) a larger, less abundant bacteroid form designated the alpha race and (2) smaller, more numerous bacteroids, the beta race.—A review of the Hemipter species so far studied shows that these presumably mutation phases fall into 7 distinct categories cited in the text. The inciting cause of the modifications or mutations and of attendant bacteroid formation presumably lies in introducing an original bacterial organism into unwonted nutritional relations. The author suggests that pure culture investigations may throw light on the question.—William L. Bray.

5990. BURKE, VICTOR, AND MARY DUNNING. A new method of staining acid-fast bacteria and spores. Jour. Infect. Diseases 34: 105-109. 1924.—Methods are given for staining tubercle bacilli and bacterial spores. The methods incorporate the use of steaming or boiling carbol-fuchsin as a primary stain, decolorizing with acetone or iodine acetone and counter-staining with methylene blue or picric acid.—R. L. Starkey.

5991. DURAND, P., ET P. SÉDALLIAN. Classification sérologique des Streptocoques hémolytiques. [A serologic classification of the hemolytic Streptococci.] Compt. Rend. Soc. Biol. 88: 792-794. 1923.—A classification based on agglutination is given and discussed.—Oran Raber.

5992. ODDO, C., S. COSTA, ET L. BOYER. Sur un germe d'endocardite infectieuse maligne. Transmission expérimentale au Lapin. [Malignant infectious endocarditis. Experimental transmission to the rabbit.] Compt. Rend. Soc. Biol. 88: 1309-1310. 1923.—An unidentified Coccus is described.—Oran Raber.

5993. ROBINSON, ELLIOTT STERLING. Antigenic relationships of Bact. typhosum. I. Agglutination. Jour. Bact. 8: 533-542. 1923.—Agglutination tests of a number of typhoid strains show that such strains present considerable antigenic differences in so far as such tests furnish valid evidence. These differences are not sufficiently clear cut and definite to permit the designation of types or groups, particularly since the descendants of a single culture may show similar variations. The failure of a strain to be agglutinated by an anti-typhoid serum is not proof of the non-typhoid nature of the strain; nor is failure of a serum to agglutinate a strain of *Bacterium typhosum* proof of a lack of typhoid agglutinin in the serum.—Author's summary.

### MYXOMYCETES

5994. JAHN, E. Myxomycetenstudien. [Studies of Myxomycetes.] Ber. Deutsch. Bot. Ges. 41: 390-396. 1 fig. 1923.—The author found a specimen of *Spumaria solida* Sturgis near Strausberg. He believes the name *Spumaria* and not *Mucilago* should be used for the genus.

The author also found the following moor inhabiting species. *Badhamia lilacina*, *Stemonitis dictyospora*, *Physarum rubiginosum*, *Stemonitis trechispora*, *Sepidodernia tigrinum*, *Diderma simplex* and *D. ochraceuni*.—Hally Jolivet Saz.

## PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, *Editor*

(See also in this issue Entry 6278)

5995. BENSON, W. N. *Palaeozoic and mesozoic seas in Australasia*. Trans. and Proc. New Zealand Inst. 54: 1-62. 11 fig. 1923.—The marine plants present in these deposits are mentioned.—An especially full bibliography is appended.—Wm. Randolph Taylor.

5996. BROWNE, ISABEL. *Note sur les bractées de Palaeostachya gracilis* Ren. [Note on the bracts of *Palaeostachya gracilis*.] Bull. Mus. Hist. Nat. 29: 541-542. 1923.—The author has examined petrified material of cones of this species, which Renault referred to *Volkmannia*, and in one transverse section is enabled to make out certain structural details of the sterile bracts hitherto unknown.—E. W. Berry.

5997. DICKERSON, ROY E. *Review of Philippine paleontology*. Philippine Jour. Sci. 20: 215-216. Pl. 14. 1922.—The author reviews the paleontology of the Philippine Islands, listing the following species of plants, some of which are figured: *Shorea polysperma*, *S. guiso*, *S. sp.*, *Anisoptera thurifera*, *Beilschmiedia cairocan*, *Phoebe sterculioides*, *Calophyllum blancoi*, *Diplodiscus paniculatus*, *Anamirta cocculus* and *Mapania numilis*. These come from Sagada in the Island of Luzon, from beds referred to the Malumbang formation, and considered to be Pliocene in age. The strata are 1500 meters above sea level, and none of the recorded plants, all of which are existing species, occur above 800 meters, denoting a considerable change in the altitude of the land since the Pliocene.—E. W. Berry.

5998. ERDTMAN, GUNNAR. *Beitrag zur Kenntnis der Mikrofossilien in Torf und Sedimenten*. [Contribution to the knowledge of micro-fossils in peat and sediments.] Arkiv för Bot. 18<sup>4</sup>: 1-9. 2 pl., 22 fig. 1923.—The work contains a series of drawings of pollen-grains and spores common in peat and sediments. The structural peculiarities of the exine are as a rule more conspicuous in fossil than in living material. Some kinds of pollen are very difficult to distinguish from one another—such as *Quercus* and *Viola*, *Fagus* and *Helianthemum*, *Betula* and *Ostrya* or *Corylus* and *Myrica*. Pollen grains or spores of the following species are described and figured: *Hydrocotyle vulgaris* L., *Sium latifolium* L., *Oxycoccus quadripetalus* Gil., *Calluna vulgaris* (L.) Hull., *Fragaria excelsior* L., *Gentiana pneumonanthe* L., *Menyanthes trifoliata*, L., *Scutellaria galericulata* L., *Lycopus europaeus* L., *Pinguicula villosa* L., *Utricularia minor* L., *Galium palustre* L., *Sphagnum* sp., *Tilletia sphagni* Nawasch., *Dryopteris thelypteris* (L.) A. Gray, *D. spinulosa* (Müll.) O. Ktze, *D. linnaeana* C. Chr., *D. filix mas* (L.) Schott, *D. cristata* (L.) A. Gray, *Polypodium vulgare* L., *Struthiopteris filicastrum* All., *Cystopteris fragilis* (L.) Bernh., *Athyrium filix femina* (L.) Roth, *Lycopodium annotinum* L., *L. clavatum* L., *L. inundatum* L., *L. Selago* L., *Taxus baccata* L., *Picea abies* (L.) Karst., *Pinus silvestris* L., *Typha latifolia* L., *Alisma plantago-aquatica* L., *Phragmites vulgaris* (Lam.) Druce, *Carex aquatilis* Wg., *Salix repens* L., *Carpinus betulus* L., *Ostrya carpinifolia* L., *Corylus avellana* L., *Betula* sp., *Alnus incana* (L.) Moench., *Fagus sylvatica* L., *Castanea sativa* Mill., *Quercus sessiliflora* Martyn., *Ulmus foliacea* Gil., *Urtica dioica* L., *Rumex acetosa* L., *Atriplex patulum* L., *Stellaria palustris* (Murr.) Retz., *Nymphaea alba* (L.) Presl., *Nuphar luteum* (L.) Sm., *Drosera rotundifolia* L., *Acer platanoides* L., *Ilex aquifolium* L., *Rhamnus frangula* L., *Tilia vulgaris* Hayne, *Helianthemum vulgare* Gars., *Viola palustris* L., *Epilobium palustre* L., *Myriophyllum spicatum* L., and *M. alterniflorum* DC.—O. Heilborn.

5999. HERIBAUD, JOSEPH. *Les Diatomées des Travertins d'Auvergne*. [Diatoms from the Travertines of the Auvergne.] Ann. Biol. Lacustre 10: 5-203. 7 pl. 1921. [See this issue, Entry 5920.]

6000. KRÄUSEL, RICHARD. *Nipadites borneensis* n. sp. eine fossile Palmenfrucht aus Borneo. [Nipadites borneensis, a new palm fruit from Borneo.] Senckenbergiana 5: 77-81. Pl. 2. 1923.—The author describes fine large Nipa fruits as *Nipadites borneensis*, from the Eocene rocks of Tiga-Tikoes, central (Dutch) Borneo.—E. W. Berry.



6001. KRÄUSEL, RICHARD. Paläobotanische Notizen VII. Ueber Papillenbildung an den Spaltöffnungen einiger fossiler Gymnospermen. [Papillae formation on the stomata of some fossil gymnosperms.] Senckenbergiana 5: 81-96. Pl. 2-3, fig. 5. 1923.—The author describes some of the epidermal structure from cuticular preparations of two Triassic species of Baiera, a Triassic Ginkgo, a Permian species of Walchia, Triassic species of Ulmannia and Voltzia, Jurassic species of Pagiophyllum and Cupressites, a Triassic species of Widdringtonites, and a Lower Cretaceous species of Abietites. He discusses particularly the formation of papillae and whether or not they may be of phylogenetic or ecologic import.—*E. W. Berry.*

6002. LEMOINE, MME. PAUL. Contribution à l'étude des Corallinacées fossiles, VII. Mélobésiées miocènes recueillies par M. Bourcart en Albanie. [Contributions to the study of fossil Corallinaceae, VII. Miocene Melobesiaceae collected in Albania by M. Bourcart.] Bull. Soc. Géol. France (iv) 23: 275-283. 9 fig. 1924.—The author describes the following new species from the lower Miocene (Burdigalian) of Albania: *Lithothamnium corallinaeforme*, *L. Bourcarti*, *Lithophyllum Koritzae*, *L. sphaeroides*, and *L. (?) albanense*; and records *Lithophyllum prelichenoides* Lemoine from the same beds.—*E. W. Berry.*

6003. MARTY, PIERRE. Sur un procédé de dessin des feuilles fossiles. [A method of illustrating fossil leaves.] Bull. Soc. Géol. France (iv) 23: 381-383. fig. 1. 1923.—Attention is briefly called to the importance of carefully figuring fossil leaves, and particularly in plotting on a plane surface the contortions or obliquities or folding that have affected specimens during fossilization.—*E. W. Berry.*

6004. POSTHUMUS, O. Etapteris Bertrandi Scott, a new Etapteris from the Upper Carboniferous (Lower Coal-measures) from England, and its bearing on stelar-morphological questions. Verhandl. K. Akad. Wetenschap. Amsterdam 26: 1-6. 1 pl. 1924.—The author describes sections of an Etapteris from Shore, Lancashire, which differ from *Etapteris Bertrandi*, with which the specimens in the British Museum were correlated. This difference is seen principally in the arrangement of the pinna-bar and its methods of union with the petiolar bundle.—*E. W. Berry.*

6005. POSTHUMUS, O. Osmundites Kidstoni Stopes. Ann. Bot. 38: 215-216. 1924.—The author presents evidence tending to prove that this species, described a few years ago by Stopes as an Osmundites with a solid prostele, consists of Osmundites leaf bases penetrated by the stele of some unknown plant not at all related to the leaf bases.—*E. W. Berry.*

6006. STERNBERG, CHARLES M. Notes on the Lance Formation of southern Saskatchewan. Canadian Field Nat. 38: 66-70. 1924.—This paper contains a list, prepared by Berry, of the fossil plants found at Rocky Creek, Saskatchewan.—*E. W. Berry.*

## PATHOLOGY

FREDERICK V. RAND, *Editor*

LILLIAN C. CASH AND HARRY BRAUN, *Associate Editors*

(See also in this issue Entries 5619, 5629, 5631, 5650, 5655, 5657, 5671, 5675, 5679, 5688, 5702, 5706, 5713, 5724, 5737, 5744, 5769, 5787, 5817, 5821, 5823, 5881, 5890, 5893, 5906, 5925, 5939, 5948, 5951, 5952, 5953, 5959, 5969, 5975, 5980, 5986, 5989, 5990, 6150, 6164, 6185, 6188, 6219, 6220, 6224, 6238, 6239, 6249, 6250, 6333, 6337)

## DISEASES CAUSED BY FUNGI

6007. D'ANGREMOND, A. Bestrijding van Phytophthora Nicotianae in de Vorstenlanden [Combating Phytophthora Nicotianae in the Vorstenlanden.] Mededeel. Proefsta. Vorstenland. Tabak 39. 1-59. 3 pl. 1919.—No uniform policy of destruction of infected tobacco stems or disinfection of the soil is practised in Java. Tobacco stems have a commercial value as fuel, and hence find their way from one plantation to another, and are returned to the soil in the native compost carrying reinfections. The indications are that *Phytophthora Nicotianae* can live in the soil for as long as 15 months, and, during the alternating cultivation of rice, it can also be spread by irrigation and drainage. Experiments were made using benzine

(2.5 liters per M<sup>3</sup>), and carbonbisulphide (580 gm. per M<sup>3</sup>) as manure disinfectants. The benzine was worthless. The author believes that it is possible thoroughly to disinfect dessa-manure with carbonbisulphide. Although in the plots so treated some deaths have occurred, they occurred at a later date, and are attributed to secondary infections. The plants growing in these plots were apparently much stronger than in those enriched with the untreated dessa-manure.—*L. S. and W. H. Weston.*

6008. D'ANGREMOND, A. Bestrijding van *Phytophthora Nicotianae* in de Vorstenlanden II. [Combating *Phytophthora Nicotianae* in the Vorstenlanden.] Proefsta. Vorstenland. Tabak 43. 1-116. 2 pl. 1920.—Tests for *Phytophthora Nicotianae* were made on samples of dessa-manure (native compost) as follows: 8 liters of manure were made into a paste with spring water, 100 cc. of which was smeared onto the underside of live tobacco leaves and each leaf separated from the others by a piece of fresh banana leaf. Such piles of leaves were put into tins for 24 hours, washed in running water, and returned to the tins. After 24 and 48 hours the *Phytophthora* spots on the leaves were counted. From such tests 47-60% of dessa-manure, 20-50% of stable manure, 63-73% of mixed manures, and 10% of town manures were considered infected. This test, however, was not considered sensitive enough to be of practical value. Manured test plots showed a higher percentage of infection than un-manured; but many cases were found to show that drainage from one field to another, as well as other factors, greatly increase field infections. Wet treatment of manure with copper sulphate was considered inadequate as a disinfectant, and while carbonbisulphide was found more successful, it is considered of doubtful practical value because of the expense involved. Various agricultural practices and their relationship to spreading infection are discussed.—*L. S. and W. H. Weston.*

6009. D'ANGREMOND, A. Onderzoekingen tot het vinden van een tegen *Phytophthora Nicotianae*, de Haan, weerstandskrachtig tabaksras. [Investigations towards the finding of a variety of tobacco resistant to *Phytophthora Nicotianae*, de Haan.] Mededeel. Proefsta. Vorstenland. Tabak 37. 1-29. 1 pl. 1919.—*Phytophthora Nicotianae* attacks tobacco of all ages in the Vorstenlanden. In nurseries it can be controlled by the use of artificial manure, careful watering, and regular spraying with Bordeaux mixture, but in the field it is impossible to protect plants from the disease. One hundred thirty-eight varieties of tobacco were used in infection experiments. Inoculations were made by putting 2 teaspoonsful of infected earth (a mixture of rich vegetable soil and finely chopped stems of tobacco plants attacked with *Phytophthora*) at the lowest part of the stem. Kanari and Y<sub>10</sub>, the varieties grown in the Vorstenlanden, were found to be hardier when infected, but ultimately they also die as do the introduced varieties. The Timor gebobbeld variety, as well as an F<sub>5</sub> hybrid from a Kanari and Timor cross, shows some percentage of recovery from infection. Hybrids from Hatano—which is itself less resistant—are more resistant than hybrids from Kanari. The very resistant varieties can be used only to fill up gaps in plantings, as the quality of their product is far inferior to the native Kanari and Y<sub>10</sub> customarily grown. These resistant varieties are Santiago dl. Caballeros, Timor gebobbeld, Stewart Cuban, Okinawa, and Havana Criollo.—*L. S. and W. H. Weston.*

6010. ARNAUD, G. Sur deux champignons parasites des pruniers dépérissants. [Two fungi connected with die-back on plum trees.] Rev. Path. Vég. et Entomol. Agric. 10:346-350. 1 fig. 1923.—*Valsa leucostoma* and *Eutypella Prunastri* are described on twigs of *Prunus* in orchards around Paris. These fungi are, in general, but weakly parasitic. However, under special circumstances they may aggravate injuries to trees which would otherwise recover with return of more favorable conditions.—*J. Dufrenoy.*

6011. ARTSCHWAGER, ERNST. Anatomical studies on potato-wart. Jour. Agric. Res. 23: 963-968. 5 pl. 1923.—The potato wart is a foliar branch system composed primarily of normal host tissue with typical traumatic cells found only in the peripheral region. The existence of various types of warts seems to be bound up with the relative susceptibility of the host, the nature and extent of the primary infection, and such factors as tend to modify plant growth in general.—*Author.*

6012. BARSS, H. P. Brown-rot and related diseases of stone fruits in Oregon. Oregon Agric. Exp. Sta. Circ. 53. 1-18. 10 fig. 1923.—This is a rather popular discussion of the troubles which have generally been included under the term "brown rot." Growers often



fail to distinguish between true brown-rot of fungous origin and a false brown-rot or internal browning of physiological origin. Most of the true brown-rot on fruits in Oregon is caused by *Sclerotinia cinerea* (Bon.) Wor. There is a closely related fungus, common on the Pacific Coast, which causes severe attacks of blossom and spur blight and twig canker, but little fruit rot. This is a fungus of the *Monilia* type which differs from the conidial stage of *S. cinerea* in both general appearance and in artificial cultures. Its perfect stage is unknown and it has, therefore, been named *Monilia oregonensis* Barss and Posey.—The natural conditions promoting or retarding the development of brown-rot are discussed and control measures are recommended.—C. E. Owens.

6013. BARTHOLOMEW, E. T. *Alternaria* rot of lemons. [Abstract.] *Phytopathology* 14: 120. 1924.

6014. BLARINGHEM, L. Notes sur la biologie des rouilles et des charbons. III. Infection partielle par les Ustilaginées. [Biological notes on rusts and smuts. III. Partial infection by the Ustilaginaceae.] *Rev. Path. Vég. et Entomol. Agric.* 10: 246-252. 1 fig. 1923.—On the same individual plants of *Zea mays*, *Hordeum distichum nutans*, or *Lycchnis dioica*, all inflorescences which form early in the season may be healthy, while most of those which form in fall are smutted. It is concluded that the mycelium of *Ustilago Maydis*, *U. Hordei* and *U. Violacea* might be present from the beginning in all plants, but conditions favorable to the formation of the host-fungus complex in ovaries are not obtained until late in the season.—J. Dufrenoy.

6015. BOYCE, J. S. Investigative work on white pine blister rust in the Pacific Northwest for 1922. [Abstract.] *Phytopathology* 14: 124. 1924.

6016. BRERETON, W. LEGAY, AND H. BROADFOOT. Orchard experiments. Trials with controls for apple mildew. *Agric. Gaz. New South Wales* 35: 209-210. 1924.—Data are given for estimating cost of preparation of the spray materials, atomic sulphur, atomized sulphur, colloidal sulphur, and hydrated lime-sulphur. The cost of preparing colloidal sulphur [see *Bot. Absts.* 12, Entry 2688] is estimated at 62 cents per 100 gallons, which is much cheaper than the estimated costs of the other sprays. Attention is called to the fact that colloidal sulphur can be made in stock quantities and kept until desired.—L. R. Waldron.

6017. C[HEVALIER], A. La rouille des arachides. [Leaf rust of peanuts.] *Rev. Bot. Appl. et Agric. Coloniale* 2: 366-367. 1922.—Recently, in Science, J. C. Arthur has called attention to the danger of introducing into the United States a disease of peanuts (*Puccinia arachidis* Speg.) which develops as a leaf-spot. The disease originated, doubtless, in South America, and has already made its appearance in Florida, where they have been able to stamp it out. So far as the writer knows this disease does not occur in tropical Africa, and he advises the prohibition of peanuts from America into Senegal, where peanut culture is very important. The disease is known in Argentina, Dutch Guiana, and in some parts of the West Indies.—Paul Russell.

6018. COLBY, ARTHUR SAMUEL. Sooty blotch of pomaceous fruits. *Illinois Acad. Sci. Trans.* 12: 139-175. 5 pl., 6 fig. 1920.—The confusion which has existed as to the fungi causing fly speck and sooty blotch lead to this study. A history of the malady is presented. A discussion of symptoms, economic importance and geographic distribution follows. A detailed morphological study of the fungus causing sooty blotch showed the thallus to be of several types, in general made up of dense mycelial strands with cell aggregates along the branches. Pycnidia were found scattered throughout the thallus. They are very numerous on apple fruit, averaging 1000 per square cm. Mature spore bearing pycnidia were rarely found. Pycnidia bear conidia with paraphyses. Pycnidial structure and formation is discussed. Conidia are borne on very short conidophores and are hyaline. They measure  $10-20 \times 4-7 \mu$ .—The taxonomy of the fungus is treated very fully. The author concludes that the fungus belongs to no existing genus and proposes the generic name, *Gloeodes*. The sooty blotch thus becomes *Gloeodes pomigena* (Schw.) Colby. The hosts observed for sooty blotch are peach, apple, blackberry and black mustard. The relative susceptibility of various species of apple are tested. Control measures previously employed are given and recommendations concerning pruning and proper spraying are presented. An annotated bibliography is appended.—H. W. Anderson.

6019. CREPIN, CH. Les rouilles du blé en 1923 à Grignon. [Wheat rusts in 1923 near Paris.] Rev. Path. Vég. et Entomol. Agric. 10: 318-323. 1923.—*P. glumarum* appears first and causes the worst damage from the end of March to maturity of the wheat. *P. triticea* appears about the middle of June. *P. graminis* appears only towards the end of July and proves the least dangerous of the three. *Triticum dicoccum dicoccoides* and the hybrid, *T. dicoccum dicoccoides* × *T. compositum*, proved somewhat susceptible to *P. triticea*. Two kinds of resistance are recorded: (1) the parasite is unable to enter the host or if it does it is killed before it causes any lesion. (2) The parasite enters the tissues, but the infected tissues rapidly die.—*J. Dufrenoy*.

6020. DODGE, B. O. Effect of the orange-rusts of *Rubus* on the development and distribution of stomata. Jour. Agric. Res. 25: 495-500. 1 pl., 1 fig. 1923.—In normal leaves of common species of *Rubus* most of the stomata are located on the lower side, a few being formed on the upper sides at the tips of the serrations. When these plants are systemically infected with the gametophytic stage of the orange-rust, *Gymnoconia interstitialis*, the leaves into which the mycelium has penetrated develop large numbers of stomata on the upper side in addition to the normal number occurring on the lower side. If the hyphae have invaded only certain parts of a leaf, such parts alone develop additional stomata on the upper side. The normal functioning of the lower epidermis is greatly interfered with by the large sori. The appearance of mature aecidia along with the unfolding of the leaf materially interferes with the development of the stomata on the lower side. The invasion of the tissues of the leaf by the sporophytic or teleutospore mycelium does not affect the normal development of stomata by the leaf.—*John W. Roberts*.

6021. DODGE, B. O. Systemic infections of *Rubus* with the orange rusts. Jour. Agric. Res. 25: 209-242. 7 pl., 7 fig. 1923.—The distribution of the mycelium in roots, stems and leaves of black raspberries, blackberries, and dewberries was studied. Experiments are described showing how the black raspberry is commonly infected by the long-cycled orange rust *Gymnoconia interstitialis* and how the blackberry is ordinarily infected by the short-cycled form. The long-cycled rust is spread among black raspberries largely through the infection of the rooting cane tips by sporidia which develop from teleutospores maturing about this time on some species of *Rubus* in the vicinity. The tip plants, if allowed to grow or if set out as nursery stock, are systemically infected from the start and are worthless as fruit bearers. Infected canes do not commonly take root at their tips so that the rust on this host is not spread to any extent "vegetatively," as it is in the blackberry. Raspberries were infected by sowing sporidia from the rust on blackberry. Root shoots of the blackberry were readily infected by sporidia of the short-cycled rust. This rust usually becomes established as a perennial parasite if the shoots are only a few inches high when infected. The mycelium does not attack the growing point but grows down along the cambium and phloem into the underground organs. The infected shoot most often develops normally and blossoms and bears fruit without showing any signs of rust except at the lowest nodes. Canes arising the next spring from the infected crown are systemically infected and do not blossom. Canes up to 2-3 feet high can be infected but in this case the mycelium is more or less localized and does not usually reach the underground parts of the host before the cane dies naturally. Among the varieties of cultivated blackberries experimentally infected were the Iceberg, Crystal White, Kittatinny, Blowers, Ancient Briton, Mercereau, Taylor. The Lawton and Snyder were not infected; they are apparently very resistant. The question is raised as to whether a variety which can be infected readily with the sporophytic or teleutospore stage of the *Gymnoconia* may not at the same time be very resistant to the orange rust stage.—Measures for controlling these rusts are suggested.—*C. L. Shear*.

6022. DUCOMET, V. Sur une maladie de la pomme de terre nouvellement observée en France. [A disease recorded for the first time on the Irish potato in France.] Rev. Path. Vég. et Entomol. Agric. France. 10: 324-325. 1923.—*Cercospora concors* was observed to cause some damage in potato fields of Central France.—*J. Dufrenoy*.

6023. HOTSON, J. W., AND LENA HARTGE. A disease of tomatoes caused by *Phytophthora mexicana* sp. nov. [Abstract.] Phytopathology 14: 121. 1924.

6024. JAGGER, IVAN C. Immunity to mildew (*Bremia Lactucae* Reg.) and its inheritance in lettuce. [Abstract.] Phytopathology 14: 122. 1924.



6025. JENSEN, HJ. *De Lanasziekte en hare bestrijding III.* [The lanas disease, *Phytophthora Nicotianae*, and its control. III.] Mededeel. Proefsta. Vorstenland Tabak 38: 35-53. 1919.—Part I. Analyses were made of water from streams, irrigation ditches, puddles etc. to determine whether such water is capable of infecting plants with *Phytophthora Nicotianae*. Leaves which were left 3 hours in jars of such water, gave good infection results. The conclusion is that water may be dangerously infective in the field, that the chances from standing are greater than from running water, and that the infection of water with *P. Nicotianae* is due to the presence of bits of stem more than to conidia or swarmspores. A very few bits of stem are sufficient to infect water heavily, and running water may carry this infection at least 1000 meters. Although the period that the water remains infective is not known, in the field it is presumed to lose its infective power quickly. Other organisms tend to destroy the *Phytophthora* in stagnant water.—Part II. Experiments were made in disinfecting dross-mest or native compost. The compost after being heavily infected with *Phytophthora* was divided into 4 boxes—one to be used as a control. In Box A, 260 gm. of ammonium sulphate (Z A) and 520 gm. of lime (kalk)—making a total of 600 gm. Z A—were mixed with 1 cubic m. of manure. This is equivalent to a cost of 10 florins per picul of Z A or 3 florins per 30 cubic m. In Box B, double the quantity—1200 gm.—of Z A was mixed with 1 cubic m. of manure,—making a cost of 6 florins. In C, the same amount was spread over the manure in 3 layers instead of being mixed in. It was found to disinfect slightly more strongly right in the layer. Treatment of manure to a cost of 3 florins was considered useless; to 6, only a little better; but in amounts up to a cost of 10 showed good results during 1 year. The nitrogen content decreased in the boxes treated with Z A more than in the untreated box.—L. S. and W. H. Weston.

6026. KHAZANOFF, AMRAM. *A new tumor of the apricot.* Jour. Agric. Res. 26: 45-60. 13 pl. 1923.—A description is given of the gross appearance, pathological histology, causal fungus and control measures of a new tumor of the apricot. It was never found on young trees or the new wood of older trees and is practically restricted to the Moorpark variety. This tumor is distinguished from crown gall chiefly because it contains numerous gum pockets, is lacking in xylem elements, and has cork strands penetrating the phloem. The apricot tumor has a sharp line of demarcation between the phloem and cork. Although no claim is made that the etiology is clearly proven, a new form *Monochaetia rosenwaldia* n. sp., is described, which is believed to be the causal agent. Control was accomplished by excision and the application of Bordeaux paste.—A. J. Riker.

6027. MACKIE, W. W., AND G. E. PAXTON. *A new disease of cultivated barley in California caused by Helminthosporium californicum* n. sp. [Abstract.] Phytopathology 14: 124. 1924. [See also Bot. Absts. 13, Entry 3620.]

6028. MATZ, JULIUS. *Dry top rot of sugar cane.* Jour. Porto Rico Dept. Agric. 6<sup>3</sup>: 28-47 6 fig. 1922.—This disease is a premature drying out of the tender and growing uppermost leaves and joints due to the clogging of the vascular system with *Plasmodiophora vascularum* n. sp. When cut across, the clogged fibers appear orange yellow, sometimes pink and even red. The organism is confined to the vascular tissues usually of the lower portion of the host. In its young stage it possesses a plasmodium composed of a granular mass of cytoplasm. As it develops the granules increase in size and become surrounded by a clear layer of cytoplasm. These bodies undergo a process of division, forming at first 2 or 4 and sometimes 6 parts. Each subdivided portion becomes surrounded by a hyaline layer which enlarges until the outer layer of the mother granule is broken and the spores are liberated. The author does not consider the granules in the plasmodium to be nuclei, but immature spores, since they gradually develop into large resting spores. The mature spores are spherical, smooth bodies having a granular content. The disease may be transmitted in seed and carried from crop to crop in infested soil.—Geo. H. Dungan.

6029. MIEGE, M. *Ennemis et maladies de la betterave observés au Maroc.* [Insects and fungous pests of *Beta vulgaris* in Morocco.] Rev. Path. Vég. et Entomol. Agric. 10: 339-341. 1923.—Records of *Sphaerella tabifica*, *Uromyces Betae*, *Cercospora Beticola* and a *Sclerotium* are given.—J. Dufrenoy.

6030. NICOLAS, G[USTAVE]. **Le traitement contre la cloque du pêcher dans le sud-ouest. [Spraying peach for Exoascus in southwestern France.]** Rev. Path. Vég. et Entomol. Agric. 10: 272. 1923.—Spraying during January or early February with Bordeaux mixture containing 5%  $\text{CuSO}_4$  proved efficient against *Exoascus deformans*.—J. Dufrenoy.

6031. OGILVIE, LAWRENCE. **The possibility of the introduction into Bermuda of the Panama disease of the banana.** Agric. Bull. Bermuda Dept. Agric. 3<sup>2</sup>: 7-8. 1924.—Evidence is presented to show that there is little danger of the Panama disease becoming of importance in Bermuda. The commonly grown species, *Musa Cavendishii*, is said to be immune to the disease.—H. H. Whetzel.

6032. PETRESCU, C. **Contribution a l'étude biologique de la flore de Moldavie. Associations biologiques avec parasitisme simple. [Contribution to the biological study of the flora of Moldavia. Biological associations with simple parasitism.]** Compt. Rend. Soc. Biol. 88: 950-953. 1923.—Attention is called to the relations existing between the parasite and the host in the following cases: *Uromyces Pisi* and *Pisum sativum*, *U. fabae* and *Vicia faba*, *Puccinia Pruni-spinosae* and *Prunus domestica* L., *P. absinthii* and *Artemisia annua*, and *Sphaerotheca mors-uae* and *Ribes grossularia*.—Oran Raber.

6033. PUTTERILL, V. A. **Plant diseases in the Western Cape Province. X.** Jour. Dept. Agric. Union South Africa 7: 332-336. 4 fig. 1923.—Some of the causes of wastage in export grapes are discussed. Wastage is usually due to injury caused in the process of packing, and to fungoid attacks. Chief among the latter are *Botrytis cinerea* Pers.; *Penicillium* spp., chiefly *Penicillium expansum*; *Rhizopus* spp., particularly *Rhizopus nigricans* Ehr.; and *Aspergillus* sp., probably *A. niger*.—A treatment is recommended for *Botrytis* mold.—L. J. Goldblatt.

6034. SHAPOVALOV, M., AND J. W. LESLIE. **The behavior of certain varieties of tomato to the wilt disease (Fusarium) in California.** [Abstract.] Phytopathology 14: 121. 1924.

6035. SHERWOOD, EVERETT CLIFTON. **Hydrogen-ion concentration as related to the Fusarium wilt of tomato seedlings.** Amer. Jour. Bot. 10: 537-553. Pl. 38. 1923.—The author grew tomato plants in flats of naturally acid sandy loam and silt loam adjusted to various degrees of acidity and alkalinity by the use of calcium carbonate. The H-ion concentration of the soil was determined by the colorimetric method. The soil was inoculated with *Fusarium lycopersici* and maintained as closely as possible at temperature of 26° to 28°C., the optimum for disease development. In every case the percentage of diseased and dead plants decreased markedly as the H-ion concentration was lowered. The 2 types of soil differed to some extent in the amount of disease developed and the author believes that the supply of plant food, the degree of aeration, the supply of organic matter and other factors may play some part in determining these results. The fungus was also grown in nutrient solutions adjusted to H-ion concentrations of from pH 1.8 to pH 8.4 and was found to thrive at concentrations from pH 2.8 to pH 8.4, with a maximum at pH 4.4. At all concentrations from pH 3.6 to pH 8.4, the growth of the organism was accompanied by changes toward greater acidity of the nutrient solution.—E. W. Sinnott.

6036. SMALL, W. A. **Rhizoctonia causing root disease in Uganda.** Trans. British Mycol. Soc. 9: 152-166. Pl. 5-6. 1924.—A root disease of *Grevillea robusta* which is planted extensively in Uganda, Africa, was found to be due to a species of *Rhizoctonia* which is described as *R. lamellifera* n. sp. The morphology and cultural characteristics of the fungus are discussed in detail. The same fungus occurs on tea and on *Biza orellana* and what is believed to be the same fungus occurs also on *Casuarina equisetifolia* and *Coffea robusta*. Inoculation experiments indicate, however, that *Coffea arabica* is immune to the disease.—W. B. McDougall.

6037. SMITH, R. G. **A chemical and pathological study of decay of the xylem of the apple caused by Polystictus versicolor Fr.** Phytopathology 14: 114-118. 1924.—The analyses indicate that all elements of the wood except lignin are attacked. The specific gravity of the wood is reduced from 0.63 to 0.44. A brief description of the analytical methods is given.—B. B. Higgins.

6038. SPIECKERMANN, A. **Zur Bekämpfung des Kartoffelkrebses. [Combating potato wart.]** Mitteil. Deutsch. Landw. Ges. 39: 191-192. 1924.—The author emphasizes the value of planting immune varieties rather than using quarantine measures or large scale soil sterilization.—A. J. Pieters.



6039. STEVENS, NEIL E. Notes on cranberry fungi in Massachusetts. Phytopathology 14: 101-107. 1924.—During a period of 14 years 5412 cultures of fungi have been isolated and identified from decayed cranberries (*Vaccinium macrocarpum*). In order of frequency, those isolated more than ten times are *Fusicoccum putrefaciens* Shear, *Glomerella cingulata* *vaccinii* Shear, *Phomopsis* sp., *Sphaeronea oxycocci* Shear, *Guignardia Vaccinii* Shear, *Penicillium* spp., *Dematium* sp., *Pestalotzia guerpini vaccinii* Shear, *Acanthorhynchus Vaccinii* Shear, and *Alternaria* sp. The conditions under which the berries are stored influence the relative importance of these fungi. When they are stored at a temperature of 0°C. the development of some of the fungi is entirely inhibited while that of *Fusicoccum putrefaciens* is apparently not retarded. Cultures from green cranberries indicate that infection by these fungi occurs before the berries are mature.—B. B. Higgins.

6040. TEHON, L. R., AND P. A. YOUNG. Notes on the climatic conditions influencing the 1923 epidemic of stem rust on wheat in Illinois. Phytopathology 14: 94-100. 1 fig. 1924.—Careful surveys of the wheat fields were made in several counties of Illinois in order to locate the first infections by stem rust (*Puccinia graminis* Pers.), to follow the spread of infection from the primary loci, and to correlate these records with climatological conditions in each locality. The results indicate that primary infection in each instance occurred during the periods of damp, moderately warm days from May 25 to 29 or June 2 to 6; and that subsequent spread of the disease occurred during similar periods.—B. B. Higgins.

6041. TISDALE, WILLIAM B. Influence of soil temperature and soil moisture upon the Fusarium disease of cabbage seedlings. Jour. Agric. Res. 24: 55-86. 2 pl., 4 fig. 1923.—Cabbage yellows caused by *Fusarium conglutinans* Wollenw. is more prevalent during the midsummer months when the soil is hot and dry. Under such conditions even the resistant strains of cabbage, such as Wisconsin Hollander, may show a considerable percentage of incipient disease, but upon the return of more favorable weather conditions (rain and lower temperature) they usually overcome the attack and produce marketable heads.—On potato-agar plates the parasite grew at temperatures ranging from 7° to 35°C. Using the diameter of colonies as a criterion, the optimum temperature at the end of 7 days was 25° to 27°C. Although no growth took place in 7 days at 37°, the organism was not killed at this temperature. By means of the Wisconsin tank method it was found that cabbage yellows develops in seedlings growing in "sick" soil at soil temperatures ranging from 17° to 35°C. At 17°C. even in the most susceptible strains it develops very slowly.—In naturally infested soil the disease appears first and develops most rapidly in seedlings of both resistant and susceptible strains at 26° to 29° and in sterilized, artificially inoculated soil at 29° to 32°C. It appears from these data that the optimum temperature for the vegetative growth of the fungus in culture practically coincides with the optimum for the development of yellows in seedlings. Cabbage seedlings grew at all temperatures from 14° to 38°C. At 38°, however, although the seedlings emerged from the soil, most of them died before developing any true leaves. The optimum soil temperature for seedling growth was found to be about 20°C. Under controlled conditions the incubation period for the disease varied from 18 days at 17°C., to 8 days at 29° to 32°. With constant favorable temperature, yellows developed at any percentage of soil moisture permitting growth of cabbage seedlings. In soil with a moisture holding capacity of 46% the yellows developed more rapidly and destructively in susceptible plants when the moisture was held at 15% than at 19, 23 or 26%. Nineteen per cent soil moisture was the most favorable for the growth of cabbage seedlings when the soil temperature was held at 23°C. and the air at 14° to 18°C. The growth of plants was materially checked at 26% and also at 15% soil moisture. The soil moisture (15%) which was too low for good growth of the host plant was most favorable for the development of yellows, while 19% soil moisture which was almost equally as stimulating to the disease was highly favorable for normal development of the host plant. Soil temperature and soil moisture influenced the occurrence of yellows in the field in a manner similar to that in the greenhouse experiments. The geographic distribution of the disease is in harmony with the experimental facts obtained with soil temperature and soil moisture. The degree of resistance shown by a strain of cabbage depends to a large extent upon the environmental conditions under which the plants are grown. Fusarium resistance in cabbage becomes more pronounced with increasing age of the plant. Results indicate that yellows-resistant strains will give the best results commercially when started in a non-infested

seed bed during cool spring weather. Results also indicate that these cabbage strains may safely be recommended for trial in *Fusarium* "sick" soil in all geographic localities where the prevailing temperatures at the different early stages of development of the cabbage plants are not distinctly higher than those in Wisconsin. The resistance of the Wisconsin strains may be expected to break down in some degree proportional with the elevation of temperature above this point. In the Northern States, even in the warmer seasons, this usually stops with the incipient stages of the disease and leaves the crop commercially successful.—*H. H. McKinney*.

6042. VON MOESZ, G. *Die Pilzkrankheiten der ungarischen Medizinalpflanzen*. [Fungus diseases of Hungarian medicinal plants.] Rept. Int. Conf. Phytopath. and Econ. Entomol. Holland. P. 280-283. H. Veenman and Sons: Wageningen, 1923.—The author lists 47 parasites of 37 hosts with notes on range and severity.—*Philip Brierley*.

6043. WEIMER, J. L. A root-rot [*Sclerotinia libertiana* Fckl.] and wilt [*Verticillium albo-atrum* R. and B.] of udo. [Abstract.] *Phytopathology* 14: 124. 1924 [See Bot. Absts. 13, Entry 4522.]

6044. YOUNG, PAUL A. Red plum curl (caused by *Exoascus mirabilis* Atk.). *Phytopathology* 14: 126. 1924.

6045. ZELLER, S. M. Decay of Douglas fir due to *Poria incrassata*. [Abstract.] *Phytopathology* 14: 119. 1924.

#### DISEASES CAUSED BY BACTERIA

6046. EYLES, F[REDERICK]. Bacterial infection of tobacco seed beds. *Rhodesia Agric. Jour.* 20: 693-694. 1923.—Examination of "damped off" seedlings from tobacco seed beds revealed the presence of bacteria. These possibly denote the presence of "wildfire" and "blackfire" organisms which most probably originate in the seed bed. The writer suggests that the presence of "damping off" areas should be taken as presumptive proof of the presence of infection until more definite proof is forthcoming.—*L. J. Goldblatt*.

6047. McCULLOCH, LUCIA. A bacterial blight of gladioli. *Jour. Agric. Res.* 27: 225-230. 2 pl. 1924.—A leaf disease of gladioli is proved to be caused by a bacterium to which the name *Bacterium gummisudans* n. sp. has been given. The leaves bear numerous spots often large, usually angular in shape, translucent, dark green, becoming yellow to brown. There is a copious, viscid exudate from the lesions in which wind-blown soil and other particles become embedded. In culture media the bacteria produce a yellow, viscid growth. The group number is 211.2322523. Seedling plants are more severely attacked by this disease than plants of blooming age. The variety Mrs. Frank Pendleton appeared to be immune to this disease while 15 other varieties in the same fields were seriously damaged.—*Author*.

6048. MATZ, JULIUS. Gummy disease of sugar cane. *Jour. Porto Rico Dept. Agric.* 63: 5-21. 1 col. pl., fig. A, 1-4. 1922.—The gummy disease, caused by *Bacterium vascularum* Smith, first discovered in Porto Rico in 1920, has spread rapidly during the last 2 years and promises to be quite serious. The symptoms always associated with the disease are yellow gum exuding from the fibers of cut canes, chlorotic areas sprinkled with small dark red streaks on the young leaves, light to dark gray dead stripes in the older leaves, and top rot. The causal organism lives in the fibers of the vascular system and seldom breaks through into the parenchyma except near the top of the plant. Experimental evidence indicates that infection from the soil rarely occurs, seemingly because the roots are non-receptive to the entrance of the organism. Infected ratoons left in the field constitute a positive source of infection. The organism may be carried by such distributing agents as cutting instruments and biting insects. A large number of varieties are quite resistant to the gummy disease, and as a control measure their culture is recommended, along with eradication of diseased stubble.—*Geo. H. Dungan*.

6049. NOBECOURT, PIERRE. Inoculations d'une Bactérie phytopathogène à des Grenouilles. [Inoculations of a phytopathogenic bacterium into frogs.] *Compt. Rend. Soc. Biol.* 88: 1041-1042. 1923.—*Bacillus carotovorus* Jones caused the death of inoculated frogs within 6 to 20 days.—The hope is expressed that there will be only one pathology for plants and animals as there is one physiology.—*Oran Raber*.



6050. SMITH, C. O. **The study of resistance to crown-gall in *Prunus*.** [Abstract.] *Phytopathology* 14: 120. 1924.—The evergreen species appear to be immune while several other species show a very high degree of resistance.—*B. B. Higgins*.

6051. SMITH, RALPH E., AND ELIZABETH H. SMITH. **Bacterial slime disease of lettuce.** [Abstract.] *Phytopathology* 14: 122. 1924.—The cause is not definitely determined.—*B. B. Higgins*.

#### DISEASES CAUSED BY ANIMAL PARASITES (INSECTS, NEMAS, PROTOZOANS, ETC.)

6052. ALDRICH, J. M. **The grape *Phylloxera*.** *Bienn. Rept. Oregon State Bd. Hort.* 17: 191-192. 1 fig. 1923.—Both American and European grapes are attacked by *Phylloxera vastatrix*, the foliage of American grapes, however, being mainly affected. It is a native insect and a brief account of its life history is given. In vineyards of the European varieties only the root form occurs and on this account the spread is comparatively slow. In the eastern states the winged form appears to be an annual occurrence but in California it is thought not to occur so often.—Owing to its subterranean habits no satisfactory remedy has been found. All vines found to be affected, together with all other vines for 3 rows in all directions, should be renewed. The ground should then be kept free of vegetation for a year. The practice of grafting European vines on American stocks has not been generally followed in all districts where *Phylloxera* does not yet occur, and considerable trouble is anticipated from this neglect. The method of propagation by cuttings should be given up and only properly grafted vines be planted.—[From abst. in *Rev. Appl. Entomol.*]—*Frederick V. Rand*.

6053. D'ANGREMOND, A. **Onderzoekingen over het dooden van *Lasioderma serricorne* Fabr. in tabak, door middel van 1° verhitting, 2° benzine.** [Experiments in destroying *Lasioderma serricorne* Fabr. in tobacco, first by heating, and second by benzine.] *Mededeel. Proefsta. Vorstenland. Tabak* 36. 1-28. Fig. A-B. 1918.—Attempts were made to destroy the *Lasioderma* beetle in all its stages in a bale of tobacco by subjecting the bale to heat. A temperature of 50°C. for 3 hours will destroy the larvae, and for 5 hours will kill the eggs. *Lasioderma* may be destroyed even in the very core of the bale by heating in a fermentation room (described in No. 31, of this publication) at a temperature of 55-60°C. Experiments using benzine vapor to replace carbonbisulphide as a disinfectant were also made, and indicate that it is a good substitute for the customarily used carbonbisulphide, but it is more expensive.—*L. S. and W. H. Weston*.

6054. BEYER, A. H. **The bean leaf-hopper and hopperburn, with methods of control.** *Florida Agric. Exp. Sta. Bull.* 164. 62-88. 16 fig. 1922.—Information concerning the life-history, habits and control of *Empoasca mali* is given.—[From abst. in *Rev. Appl. Entomol.*]—*Frederick V. Rand*.

6055. CHEVALIER, A. **Les galles de Chine et leur origine.** [The galls of China and their origin.] *Rev. Bot. Appl. et Agric. Coloniale* 3: 513-522. 1923.—An attempt is being made in Indo-China to produce Chinese galls by introducing the insect that causes them. These galls are largely used for tanning and other industries and are at present imported from China into France. The appearance, uses and chemical composition of the galls are described. They are formed as a result of the punctures of the winged aphid, *Schlechtendalia sinensis*, in the leaves of *Rhus Javanica*. It is thought possible that both the insect and its food plant may already occur in the higher regions of Tonkin and Laos, but if not, it should be an easy matter to rear the insect and cultivate the host plant.—[From abst. in *Rev. Appl. Entomol.*]—*Frederick V. Rand*.

6056. DAVIDSON, J. **Biological studies of *Aphis Rumicis* Linn. The penetration of plant tissues and the source of the food supply of aphids.** *Ann. Appl. Biol.* 10: 35-54. 2 pl., 4 fig. 1923.—The experiments discussed were carried out on *Rumex*, *Vicia faba*, *Euonymus Europaeus* and *Chenopodium album*; and also with *Macrosiphum rosarum* on rose leaves, and with *Myzus cerasi* on peach. By means of a flexible, chitinous, piercing organ the aphids penetrate the tissues of the plant and feed on the cell sap. Saliva pumped into the plant dissolves a passage for the piercing organ through the cell walls and forms a sheath for it, the walls of which are composed of substances produced by the reaction of the saliva on the cell

sap. Plasmolysis of the cells and disorganization of the cell contents follows. In the case of *Aphis rumicis* the piercing organ passes between the cells of the cortex, only occasionally passing through individual cells. Eventually it reaches the vascular bundles. In beans the phloem is the chief source of food supply, though other cells, such as the cortex and mesophyll of the leaf, may be tapped, especially when the plant is heavily infested. On *Rumex* the xylem is often tapped for food. The presence of a thick cuticle may prevent young aphids from piercing into the tissues, and thus inhibit a general infestation of the plant.—Investigations should be made of the cell sap of plants under varying cultural conditions, as the latter are probably associated with the more favorable development and reproduction of aphids on certain plants.—[From abst. in Rev. Appl. Entomol.]—*Frederick V. Rand.*

6057. DUNCAN, C. D. The North American species of *Phylloxera* infesting oak and chestnut (Hemiptera: Phylloxeridae). Canadian Entomol. 54: 267-276. 2 pl. 1922.—The American species of *Phylloxera*, particularly those on oaks, have been very little studied in the past. Eight or more species are discussed.—[From abst. in Rev. Appl. Entomol.]—*Frederick V. Rand.*

6058. FAES, H., ET M. STAHELIN. Le *Phylloxéra* gallicole et la désinfection des plantes de vignes. [Disinfection of grape vines for gall-forming *Phylloxera*.] Ann. Agric. Suisse 23: 295-303. 1 fig. 1922.—The various gall-producing forms of *Phylloxera* that infest grape vines, and the theories regarding the appearance of the different forms, are briefly reviewed.—Observations in field and laboratory on the biology of *Phylloxera* have shown that vines partly formed of American stock, of which the roots have been disinfected but not the shoots, harbor the winter egg of *Phylloxera* on the wood and can give rise to an infestation giving leaf galls. Experiments made at Lausanne have shown the preference of these insects (*Gallicolae*) for the leaves of American vines and their aversion to native varieties.—Experiments to ensure the destruction of the winter eggs of *Phylloxera* have been carried out using the practice of immersing the stock for 12 hours in a solution of 3% potassium sulpho-carbonate at 32° Be. to 1% black soap. When applied to the underground part of the plant only, this ensures complete destruction of the root-infesting *Phylloxera* including the eggs, and without injury to the vine. When applied also to above-ground parts of rooted stock this disinfection ensures the complete destruction of the winter egg, and thus prevents the appearance of the *gallicola* form. Growth of the plant is in no way injured by this treatment.—[From abst. in Rev. Appl. Entomol.]—*Frederick V. Rand.*

6059. FRANCHINI, G. Sur des cultures très anciennes de flagellés. [Old cultures of flagellates.] Bull. Soc. Path. Exotique 17: 32-35. 1924.—The media boullion + blood and boullion + latex of certain plants are very favorable to multiplication and continued viability of certain flagellates. *Herpetomonas pyrrocoridis* remained viable for over 1 year without transfer in each of these media. Indications of encysted forms were observed.—*Philip Brierley.*

6060. IBOS, J. Az atkakór Magyarországon. [Disease of grape vines in Hungary due to mites.] Kiserletügyi Közlemenyek 23: 1-41. 23 fig. 1920.—The mite, *Phyllocoptes vitis* Nal. attacks grape vines, living on the lower leaf surfaces. Its distribution in Switzerland, France, Austria and Dalmatia, and its bionomics are given.—Yellowish white or colorless spots develop on attacked leaves which become wrinkled and curled at the edges. Development of the vine is retarded in spring and short, thick shoots appear from the end of the stem. Infested vines bear only small and diseased grapes, if any.—Spraying in winter with lime-sulphur is recommended.—[From abst. in Rev. Appl. Entomol.]—*Frederick V. Rand.*

6061. KEMPSKI. Ueber Milbenschäden in Tee und Cinchona und die neuesten Mittel zu ihrer erfolgreichen Bekämpfung. [Mite injury to tea and Cinchona and the latest successful control methods.] Tropenpflanzer 26: 53-55. 1923.—This is a condensed review of the results secured by Bernard, Kerbosch, and Leefmans in the Dutch East Indies on the mites of tea and Cinchona.—[From abst. in Rev. Appl. Entomol.]—*Frederick V. Rand.*

6062. LAUBERT, R. Eine wenig beachtete häufige Missbildung des Holunders. [A common but little noticed malformation of elder.] Gartenwelt 26: 235-236. 1 fig. 1922.—This is a leaf malformation caused by the mite, *Eptitrimerus trilobus*.—*Frederick V. Rand.*

6063. LEIBY, R. W. Biology of the goldenrod gall-maker, *Gnorimoschema gallaesolidaginis* Riley. Jour. New York Entomol. Soc. 30: 81-94. 1 pl., 1 fig. 1922.—The life and seasonal



history of this moth is given as worked out in Vermont, New York and North Carolina. Elliptical galls due to this insect develop on the stems of goldenrod. The time of appearance and length of the stages vary considerably in the different regions studied.—[From abst. in Rev. Appl. Entomol.]—*Frederick V. Rand.*

6064. LOUNSBURY, C. P. **Thrips injury to citrus fruits.** Jour. Dept. Agric. Union South Africa 7: 213-249. 1923.—Considerable damage is done to citrus fruit in South Africa by a species of thrips different from the one known in California. In dry areas, after a period of hot, dry weather the thrips are always most troublesome, and when the new growth on the trees hardens, the insects attack the fruit. Remedies used in California are described. It is suggested that nicotine dusts should not be tried until they have been improved upon or tested sufficiently to warrant their commercial trial in South Africa. The use of oil sprays is thought to be attended with less risk in South Africa than in California, owing to differences in climate.—[From abst. in Rev. Appl. Entomol.]—*Frederick V. Rand.*

6065. MASSEE, A. M. **Abnormal leaves of Himalaya berry and raspberry.** Gardeners' Chron. 72: 281. 1 fig. 1922.—A mite, not yet identified, is thought to be the cause of abnormal leaves of Himalaya berry and allied plants such as raspberries. The buds, in many of which a reddish brown mite is found, are shrivelled and discolored.—[From abst. in Rev. Appl. Entomol.]—*Frederick V. Rand.*

6066. MERWE, C. P. VAN DER. **The citrus Psylla (Trioxa Merwei Pettey).** Jour. Dept. Agric. Union South Africa 7: 135-141. 1923.—“The conspicuous pitting and curling of citrus leaves so commonly met with is caused by a small native insect. . . .” Its life history and habits, technique of experimentation, natural enemies, climatic factors, a Transvaal outbreak and remedies are discussed.—*Frederick V. Rand.*

6067. MILLER, D. **The Olearia bud-gall midge.** New Zeal. Jour. Agric. 25: 340-344. 7 fig. 1922.—Galls on *Olearia forsteri* are caused by larvae of *Cecidomyia oleariae* Mask. In early spring there is a large flight of the midges, their numbers diminishing toward the end of November. Eggs are deposited on the buds of the developing shoots and the larvae feed on the juices of the plant and pupate in the gall. There is apparently only 1 generation a year. Control is difficult, but the best method seems to be to replace *O. forsteri* and *O. furfuracea* as ornamentals with other species not infested with this gall midge. A spray of Black-leaf 40 (1-800) in the spring might be beneficial but would have to be applied 2 or 3 times a week to be effective.—[From abst. in Rev. Appl. Entomol.]—*Frederick V. Rand.*

6068. NGUYỄN-CÔNG-TIÊU. **Note sur une Cecidomie du riz (Pachytiplosis oryzae Wood-Mason).** [A rice gall.] Bull. Econ. Indochine 25: 590-593. 1 pl. 1922.—This Cecidomyiid causes great deformation and loss in rice plants grown in Tonkin. A loss of 50 to 100% has been recorded in some localities. It is generally the young plants which are attacked, and some varieties suffer more than others. Infested plants are undersized, the leaves are yellow at the tips and the base of the plant throws out a number of shoots in the midst of which is developed a gall in the form of a long, milky tube terminating in a green tip. At the base of the gall lives the apodous larva which feeds on the plant tissues.—Flooding the young rice fields proved useless even though the larvae might be destroyed by several days' immersion because the pupae can make their way to the top of the gall tube and have no need for food. The remedy suggested is to pull up and destroy all plants attacked before pupation occurs.—A translation of previous data concerning this insect recorded at the 2nd entomological meeting at Pusa, is appended.—[From abst. in Rev. Appl. Entomol.]—*Frederick V. Rand.*

6069. PRUDHOMME, A. **Le Phylloxéra et la vigne.** [Phylloxera and the vine.] Riv. Scientif. 7: 259-264. 1920.—Vines slightly attacked by Phylloxera and treated in time with carbon bisulphide are said to be more resistant to a fresh attack, the effect being that of a prophylactic.—[From abst. in Rev. Appl. Entomol.]—*Frederick V. Rand.*

6070. SPEYER, E. R. **Researches upon the larch chermes (Cnaphlaodes strobilobius Kalt), and their bearing upon the evolution of the Chermesinae in general.** Phil. Trans. Roy. Soc. London B 212: 111-146. 2 pl., 14 fig. 1923.—The chief characteristics of the biology of the Chermesinae as compared with the Phylloxerinae are given in the introduction. A list of European genera and species with food plants and a general outline of all the main

life-cycles of *Chermes strobilobius* on spruce and larch, are given. One section is devoted to experimental work upon the parthenogenetic generations on the larch. The theoretical considerations upon the evolution of Chermesinae comprise a comparative biology of European species, from which certain conclusions are drawn.—[From abst. in Rev. Appl. Entomol.] *Frederick V. Rand.*

6071. SWEZEY, O. H. **The Java sugar cane leaf-mite in Hawaii.** Hawaiian Planters' Rec. 27: 4-7. 1 pl. 1923.—The first infestation of *Tetranychus exsicicator* in Hawaii apparently took place during the summer of 1922. These mites were very numerous under the lower leaves, causing them to develop longitudinal yellowish stripes. Older infested leaves had become reddish in streaks, while still older ones were drying up and dying. Where the cane had been thriving on account of especially favorable conditions the mites seemed to cause no particular damage.—Dusting had little if any effect on them.—It is probable that this infestation came from survivors from a ratoon crop previously on the field, which had not been thoroughly burned after harvesting.—*Paratetranychus viridis* occurs on cane leaves in Porto Rico causing similar injuries, but it is prevalent only during drought.—[From abst. in Rev. Appl. Entomol.]—*Frederick V. Rand.*

6072. WATSON, J. R. **The flower thrips.** Florida Agric. Exp. Sta. Bull. 162. 27-51. 4 fig. 1922.—*Frankliniella bispinosa* Morgan is common throughout all but the extreme southern part of Florida where it is replaced by the closely related *F. cephalica* var. *Masoni* Watson.—Most species of the rose family are attacked. Infestation is usually confined to the tenderest parts of the blossoms, though, in the absence of other food, opening buds and leaves such as those of the pear and peach may be attacked. In citrus flowers the thrips feed chiefly on the thick, fleshy petals and stamens. The life cycle and control are discussed.—Results of 6 years' spraying experiments show that 1 opportune spraying generally reduces the amount of seriously marked fruit by 50%, the chief obstacle to spraying being the irregularity of the blooming period. Lime-sulphur alone is not satisfactory under Florida conditions, and oil emulsions are not safe to use on blossoms and young fruit. Spraying is profitable in citrus groves with an average of 25 thrips to the blossom, the best insecticide being tobacco extract. Better results are obtained by the addition of a spreader consisting of 1-2 lbs. of soap to 50 gals.; or lime-sulphur, 1 to 70. The best time for the application is 1 to 2 days after the maximum bloom, and 2 treatments give better results than one.—If sufficiently abundant, *F. bispinosa* may cause the deformation or even destruction of the leaves and fruit of deciduous fruit trees. Other food plants are dewberries, blackberries, mulberries, groundnuts and roses.—Several other species of thrips are mentioned.—[From abst. in Rev. Appl. Entomol.]—*Frederick V. Rand.*

#### INFECTIOUS CHLOROSES (MOSAIC AND PEACH YELLOWS GROUPS, ETC.)

6073. CARSNER, EUBANKS, AND C. F. STAHL. **Progress report on curly-top of sugar beet.** [Abstract.] Phytopathology 14: 122-123. 1924.

6074. DUCOMET ET FOËX. **Note sur les maladies de la dégénérescence de la pomme de terre.** [Note on the diseases causing deterioration of the potato.] Rev. Bot. Appl. et Agric. Coloniale 2: 325-329. 1922.—As a result of observation trips to the potato-growing regions of England, the Netherlands, and U. S. A., the authors have come to certain conclusions in regard to the nature of, and remedies for, potato deterioration. They believe that it is not a physiological phenomenon, neither is it due to climatic conditions or continued asexual propagation, nor is it an indication of senescence, but it is of pathological origin, caused by leafroll, mosaic or related diseases. The authors conclude that these diseases are spread by inoculation of the tubers by plant lice, and recommend, as a possible remedy, field selection of healthy plants before harvesting.—*Paul Russell.*

6075. HUNGERFORD, CHAS. W., AND J. M. RAEDER. **Mosaic and leaf roll of potatoes in Idaho.** [Abstract.] Phytopathology 14: 123. 1924.

6076. JENSEN, HJ. **Eenige onderzoekingen over mozaiekziekte bij de tabak.** [Some investigations on mosaic disease of tobacco.] Mededeel. Proefsta. Vorstenland. Tabak 33. 59-66. Pl. 4. 1918.—This article supports with tabulated observations the author's previous contention, disputed by others, that mosaic plants if strong and vigorous may



develop new leaves which show no visible signs of mosaic and which have recovered. He does not consider that the plant as a whole has recovered. Care should be taken, therefore, in using seed from a bed that once has been infected with mosaic, even though the plants appear healthy. Apparent recovery from mosaic is limited to strong, vigorous plants; weak, sickly plants remain stunted and continue to develop mosaic leaves.—*L. S. and W. H. Weston.*

6077. KENDRICK, JAMES B., AND MAX W. GARDNER. Soybean mosaic: Seed transmission and effect on yield. *Jour. Agric. Res.* 27: 91-98. 1924.—Extensive inoculation tests revealed no host for the disease other than the soybean itself. The variety Midwest is very susceptible to mosaic. The Haberlandt, Black Eyebrow, A. K., Arlington, and Midwest varieties transmit the disease through the seed more readily than certain other varieties such as Feldun and Lexington. Usually from 10 to 25% of the seeds from mosaic plants produce mosaic seedlings. The transmission of mosaic seems to bear no relation to the location of the node at which the seed was produced nor to the date of infection of the parent plant. Two-year-old seed has been found to transmit the disease. Seed selected from mosaic-free plants gave rise to mosaic-free seedlings. A considerable spread of mosaic occurred during the growing season in Indiana, more in 1923, than in 1921 and 1922, and least in 1922. Among 8 varieties tested mosaic has been found to reduce the total yield of seed 30 to 75 per cent.—*M. W. Gardner.*

6078. MCKINNEY, HAROLD H., SOPHIA H. ECKERSON, AND ROBERT W. WEBB. The intracellular bodies associated with the rosette disease and a mosaiclike leaf mottling of wheat. *Jour. Agric. Res.* 26: 605-608. 8 pl. 1923.—Field experiments show certain relationships between the rosette disease and the mosaiclike leaf mottling which suggests that these conditions may be due to one causal agent. Although leaf mottling in winter wheat is typical for the mosaic diseases of the Monocotyledons it behaves somewhat differently from the known grass mosaics, in that it is carried over from year to year in the soil. Sterilizing infested soil with formaldehyde solutions or with steam appeared to control completely the leaf mottling as well as the rosette condition, even though the apparently healthy plants were surrounded by thousands of wheat plants showing an abundance of leaf mottling. In addition, flying insects, especially aphids and chinch bugs, were abundant during certain periods.—Microscopic studies of both fresh and embedded material from rosetted wheat plants show that the crown tissue is usually yellow to yellowish-brown in color, and frequently contains internal lesions made up of disintegrated cells containing granular material. Cell inclusions are present in the root, crown, sheath, and leaf tissues of such plants, and also in the leaves of plants of varieties which show the mosaiclike leaf mottling, but which are resistant to rosette. As yet these cell inclusions have not been found in plants known to be healthy. The inclusion bodies have not been found in the very young cells of the central and lateral buds. Minute bodies which are suggestive of an early stage of the large bodies have been found in cells a little distance back from the youngest cells, and from this latter region back into the older cells the bodies seem to increase in size until the largest sizes are reached in the older cells.—The cell inclusions usually occur singly in the cells, varying greatly in form; in size they range from much smaller to considerably larger than the host cell nuclei. The bodies are vacuolated and appear to be protoplasmic in nature. In a few cases, some detail has been observed in the bodies but no definite nucleus has been found. The bodies have not been found to possess independent movement. Cells containing inclusion bodies show no marked differences from the cells free from the bodies, and the host nuclei seem to show little or no abnormality when the bodies are present.—The cell inclusions in wheat are similar to those associated with certain other plant and animal diseases but they differ from some of those which have been described in diseased tissues.—While it is recognized that the cell inclusions in wheat may be a stage of some definite parasite, the relationship between the development of these inclusions and the development of the host cells does not seem to lend strong support to this theory. There is a striking resemblance between the wheat cell inclusions and the Negri and Guarneri bodies which are associated with rabies and smallpox respectively.—*H. H. McKinney.*

6079. MATZ, JULIUS. Recent developments in the study of the nature of mosaic disease of sugar cane and other plants. Jour. Porto Rico Dept. Agric. 6<sup>3</sup>: 22-27. 13 fig. 1922.—The author reviews briefly the recent work of Kunkel and Iwanowski on the presence of internal bodies in cells of corn and tobacco plants affected with the mosaic disease. He also presents Dr. Palm's conception that the minute foreign granules in cells of mosaic-infected plants are comparable to the granules found as a consequence of variola infection and other virus diseases in human beings and animals. From this Palm draws the conclusion that mosaic disease belongs to the chlamydozoonoses; that the different forms of granules found in mosaic diseased plants are either different stages of *Strongyloplasma* or by-products of this organism. In original cytological studies the author notes the destruction of chloroplasts in diseased portions of sugar-cane leaf tissue. Apparently the cell walls and other cell contents are not affected.—Geo. H. Dungan.

6080. MAUBLANC, A. La mosaïque de la canne à sucre. [Sugar cane mosaic.] Agron. Colon. No. 61. 7 p. Paris, 1923.—The discussion of this disease includes its transmission by insects, particularly *Aphis maidis*.—[From abst. in Rev. Appl. Entomol.]—Frederick V. Rand.

6081. ROSENFELD, ARTHUR H. A beneficial aspect of the sugar cane mosaic disease. Internat. Sugar Jour. 26: 191-195. 1924.—The outbreak of the mosaic disease of sugar cane in Porto Rico is training the agricultural class into giving more attention to field cultivation and has stimulated it into trying new varieties of cane over the whole island. The Kavangire or Uba cane is the only variety yet found to be immune to the disease. In many sections of the island it has been found to give a fair sugar content and purity, if harvested when 15 to 18 months old, while it always gives an agricultural tonnage greater than any of some 500 varieties tried out on the island. Java (P. Q. J.) 36, 105 and 213 show the same tolerance to mosaic in Porto Rico which they showed in Argentina and also give large tonnage yields. Besides these varieties, which have the defect of being thin-stalked and having a high fibre content, native seedlings have been developed and foreign ones imported. Of the latter the most important are the BH 10-12 and SC 12-4 seedlings.—The mosaic disease is widespread and causing considerable loss in Cuba, especially in Camagüey and Oriente. Except on some of the large sugar estates, agricultural practice is most rudimentary. The growing of the cane generally is in the hands of *colonos*. This fact will make the mosaic disease a serious problem in Cuba, for its control consists in thorough supervision of the cane fields and improved agricultural methods. If the disease spreads in Cuba as it has in Argentina and Porto Rico there will be a serious drop in the annual sugar production. As in Porto Rico, recovery will depend on the introduction of better cane varieties, better field cultivation, more coöperation between grower and manufacturer and the formation of a genuine agricultural class.—[Editorial Comment.—Internat. Sugar Jour. 26: 181. 1924.—“With the conditions of the cane industry in Porto Rico we cannot of course pretend to be so well informed as Mr. Rosenfeld, and we are glad to note his optimistic vein regarding it; but all the same” dependence on the Kavangire or Uba is a retrograde change and may bring in “more careless and slovenly cultivation as it has done in Natal.”]—C. Rumbold.

6082. SCHERFFIUS, W. H. Tobacco mosaic. Some interesting experiments on a supposed disease in Turkish tobacco. Agric. Jour. Dept. Agric. Union South Africa 8: 33-34. 2 pl. (col.). 1924.—Experiments on a supposed “mosaic” disease of Turkish tobacco to ascertain whether this disease was the real cause of green splotches in the cured leaves, proved that “mosaic” is not the primary, though it may be a secondary, cause. Experiments show that this trouble is caused by harvesting the tobacco with gummy hands and bruising the leaves in the heat of the day.—L. J. Goldblatt.

6083. SEVERIN, HENRY H. P. Curly leaf transmission experiments. Phytopathology 14: 80-93. Fig. 1. 1924.—The curly-leaf disease of sugar beets [*Beta vulgaris* L.] was produced in a small percentage of trials by placing droplets of expressed juice from leaves or roots of diseased plants within wounds in the crown of healthy young beet plants. The infective principle is generally distributed throughout the foliage and roots of diseased plants. After infective leaf hoppers (*Eutettix tenella* Baker) had fed upon the blade of a healthy beet leaf in a temperature of 103.5° F. the infective principle passed through the petiole, 7 inches long, into the crown of the plant within 30 minutes. Other experiments



were run to determine the rapidity of distribution of the infective principle. Attempts to produce curly leaf by contaminating the mouth parts of non-infective leaf hoppers with cultures of *Bacillus morulans* were unsuccessful.—*B. B. Higgins.*

6084. SEVERIN, HENRY H. P. Curly leaf transmission experiments. [Abstract.] Phytopathology 14: 123. 1924. [See preceding entry.]

6085. ZELLER, S. M. Mosaic and other systemic diseases of brambles in Oregon. Oregon Agric. Exp. Sta. Circ. 49. 1-15. 9 fig. 1923.—There are apparently 3 distinct types of systemic, infectious diseases of brambles in Oregon—mosaic, leaf curl and bramble streak (Eastern Blue Stem). The mosaic disease attacks loganberries, blackberries and black and red raspberries. The limited amount of leaf curl is confined almost entirely to red raspberries, bramble streak usually to black raspberry.—Mosaic begins with mottling of the leaves and results in progressive dwarfing of leaves and laterals until the plants are killed, usually in 3-5 years. Leaf curl results in shortened, stocky stems; dwarfed, arched and crinkled leaflets; and either an abnormally dark green or light yellow color. Bramble streaks cause mottling, curling and rosetting of the leaves and discolored markings and streaks on the stems.—These diseases are all spread by transplants from diseased plantations; the relation of insects to the spread in Oregon is not known.—Control measures recommended are roguing and use of clean nursery stock.—*C. E. Owens.*

6086. ZELLER, S. M. Mosaic disease of the loganberry. [Abstract.] Phytopathology 14: 119. 1924. [See also preceding entry.]

#### PARASITIC PHANEROGAMS

6087. CHEMIN, E., ET L. HÉDIARD. La cuscute du lin *Cuscuta epilinum* Weihe, dans le Calvados. [Flax dodder in Calvados.] Bull. Soc. Linn. Normandie VII, 3: 270-281, 1 fig. 1920 [1921].—A systematic and biological study of *C. epilinum* is given. The invasion of *Cuscuta* in fields of flax is due to infected seed. Dodder rarely persists in the field, owing to the facts that it is pulled up with the flax before the seeds are shed and the series of cereals which succeed it in crop rotation are not satisfactory hosts for the parasite. The author recommends carefully clearing the fields of plants such as *Camelina sativa*, *Sinapis arvensis*, *Convolvulus arvensis* and other weeds which may serve as hosts for *Cuscuta epilinum*.—*M. Denis.*

#### NON-PARASITIC DISEASES

6088. OGILVIE, LAWRENCE. Observations on the "slime-fluxes" of trees. Trans. British Mycol. Soc. 9: 167-182. Fig. 1. 1924.—The author believes that the peculiar mucilaginous exudations found on various kinds of trees are of physiological origin. The red-dish flux of elms, the brown flux of elms and horse-chestnuts, and the flux of apple trees seem to originate in a watery exudation from the heart wood which appears to be connected with water storage in the wood. These fluxes contain large amounts of calcium carbonate which renders the reaction favorable to the growth of various kinds of organisms. The red flux of elm trees always contains an abundance of *Fusarium*, *Oospora*, bacteria and other micro-organisms. The brown flux of elm and horse-chestnut always contains *Oospora* and usually *Fusarium* and yeast together with fluorescent bacteria, algae, insect larvae, etc. The flux of apple trees always contains three kinds of non-sporing yeasts. The white flux of willow arises in the bark from an exudation of the phloem and is acid in reaction. It contains an *Oospora*, a sporing yeast and bacteria.—*W. B. McDougall.*

6089. OVERHOLSER, E. L., A. J. WINKLER, AND H. E. JACOB. Factors influencing the development of internal browning of the yellow Newton apple. California Agric. Exp. Sta. Bull. 370. 40 p., 1 pl. 1923. [See also Bot. Absts., 13, Entry 6092.]

6090. SIEVERS, T. J. Crop injury resulting from magnesium oxide dust. Phytopathology 14: 108-113. 1 fig. 1924.—MgO dust, driven out with the smoke from the furnace, settled on the soil to such an extent as to produce decided injury to crops over an oval area 1 by 3 miles in extent about a plant for calcining magnesite ore. Chemical analyses showed as much as 56,000 pounds of Mg, calculated as MgO, per acre foot of surface soil near the plant

while the normal surface soil of the region contained about 4000 pounds per acre foot. Since the plant ceased operation two years ago the physical condition and the crop production of this soil show improvement, indicating that the injury is not permanent.—*B. B. Higgins.*

6091. WILLE, F. *Die Rauchschatenfrage der Aluminiumfabriken mit besonderer Berücksichtigung der Aluminiumfabrik Chippis.* [The smoke injury problem of aluminum factories with special reference to the Chippis aluminum factory.] 66 p., 2 fig. P. Parey: Berlin, 1922.—Direct evidences of smoke injury are: spotting, consisting of death and browning of tissues; woundcork formation below lenticels; anatomical condition of the leaves; chemical analysis of injured parts; air analysis. Indirect evidences are found in the following: the condition of the lower vegetation; accumulation of undecomposed leaves and needles; death of individual plants and organs; drying up of tips; breadth of annular rings; condition of the lichen vegetation. None of these are absolute, but are useful when observed collectively.—Little is known of hydrofluoric acid injury. Microchemical analysis of plant parts is not dependable in this case. The symptoms are similar to those caused by sulfurous and sulfuric acids.—Climatic and soil conditions near the Chippis works are generally unfavorable for cultivation. Weeds show evidence of acid injury near the nitric acid factory, but not at a distance. Injury in nearby woods appears to be due to parasitic fungi rather than to smoke injury. Cherry and apricot trees are severely injured, but investigation shows the presence of leaf and root diseases throughout the canton, thereby complicating any attempt at estimating smoke injury. There is no evidence that increased susceptibility to diseases is initiated by the presence of gases and smoke. Insects appear to shun trees injured by smoke. Proper estimation of smoke injury requires constant inspection throughout the year on the flora as a whole, comparison with similar localities, and allowance for diseases and injuries due to parasites.—*Harry Braun.*

6092. WINKLER, A. J. A study of the internal browning of the Yellow Newtown apple. *Jour. Agric. Res.* 24: 165-184. 1 pl. (col.), 2 fig. 1923.—Results are given of a study of internal browning, a nonparasitic disease, which has its beginning in the large isodiametric cells of the flesh of the Yellow Newtown apple when held at the usual temperatures of apple storage rooms. Special attention was given to the field conditions which are responsible for the susceptibility of the fruit to the disease and the internal and external factors which are immediately responsible for its development in storage. Later picked fruit browned more severely than that picked earlier. It was found that apples stored only a few degrees above the usual storage temperatures for apples showed little or no browning. There was no browning after 6 months storage at 8.3°; only very limited browning at 5°; approximately 70% of the fruit browned at 2.2°; and there was practically no normal fruit at 0°C. By lowering the temperature of the fruit 3°, by shading or tenting a tree in the orchard, the susceptibility to browning was greatly increased. When the temperature of the growing fruit was increased 4°C., by bagging in black cloth, a marked increase in the resistance was noted. Data are presented indicating that mean orchard temperature during the season of rapid growth is an important factor in the development of susceptible or resistant fruit. The disease was also reduced in storage by ventilating the fruit or by wrapping with paper that had been impregnated with good absorbents of essential oils. Histological and other studies revealed a similarity between browning and apple scald. Dilute amyl acetate, amyl valerianate and acetaldehyde applied to cut surface of fruit increased permeability as measured by electrical conductivity; it is suggested that very small accumulations of essential oils may sufficiently increase permeability to permit oxidase and substrates to come into contact, resulting in browning. The author concludes that the unusually low temperature of the growing season in the Pajoro Valley prevents the fruit from developing normally, thereby rendering it susceptible to the disease, and that the development of the browning in storage is due to an accumulation of essential oils or similar deleterious substances. [See also this issue, Entry 6089].—*Author.*

#### DISEASES OF UNKNOWN CAUSE

6093. SHAPOVALOV, MICHAEL. Effect of environmental conditions on western yellow blight of tomatoes. [Abstract.] *Phytopathology* 14: 120-121. 1924.—The cause has not yet been determined.—*B. B. Higgins.*



## GENERAL AND MISCELLANEOUS PATHOLOGICAL LITERATURE

6094. ARTSCHWAGER, ERNST. [Rev. of H. MORSTATT. Einführung in die Pflanzenpathologie: ein Lehrbuch für Land- und Forstwirke, Gärtner und Biologen. (Introduction to plant pathology: a textbook for agriculturists, foresters, gardeners and biologists.) vii + 159 p. Gebrüder Borntraeger: Berlin, 1923 (see Bot. Absts. 13, Entry 1971).]

6095. BARSS, H. P., AND A. L. LOVETT. Orchard spray program for Oregon. Oregon Agric. Coll. Extension Bull. 369. 19 p., 6 fig. 1924.—Two sets of schedules are given, one for western Oregon and one for eastern Oregon. In each set separate programs are given for various fruits as, apples and pears, prunes and plums, peaches, cherries, and apricots. Pointers on spray materials are included. A special program is suggested for the small home orchard.—C. E. Owens.

6096. BERNÁTSKY, J. Irrtümer und Missbräuche bei der Begutachtung der Bekämpfungsmittel. [Errors and misuses in formal opinions on fungicides and insecticides.] Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 126-131. H. Veenman & Sons: Wageningen, 1923.—In the interests of science as well as practical agriculture it is important to avoid as far as possible errors in expert opinions on disease preventives. In a method of procedure for working toward this end, the following points are emphasized: (1) a study of the pertinent literature; (2) biological and agricultural study of the host plants; (3) a study of the biology of the organism or animal causing the disease; (4) relation of the influence of weather, soil, cultivation and other farm practices on the host plant and on the cause of the disease; (5) a detailed chemical study of the substance in question; (6) repetition of the studies by other workers; (7) avoidance of secrecy as much as possible; (8) publication not only of results of experiments but also of methods. [See also Bot. Absts. 13, Entry 6119].—Lillian C. Cash.

6097. BRUYNOGHE, R., ET P. BRUTSAERT. La résistance des Bactériophages à l'action de certaines substances chimiques. [Resistance of the bacteriophages to certain chemical substances.] Compt. Rend. Soc. Biol. 88: 966-968. 1923.

6098. BRUYNOGHE, R., ET J. WAGEMANS. La résistance des Bactériophages au sérum neutralisant. [Resistance of the bacteriophages to neutralising serum.] Compt. Rend. Soc. Biol. 88: 968-969. 1923.

6099. FERNOW, K. H. Potato seed inspection in New York State. Agric. Bull. Bermuda Dept. Agric. 212: 1-2. 1923.—The author describes methods of inspection and gives the standards as to diseases, mixtures, etc. upon which certification is based.—H. H. Whetzel.

6100. FREMLIN, H. S. The growing importance of entomology. Entomol. Rec. and Jour. Var. 35: 136-139. 1923.—The relation of insects to plant life and diseases of both plants and animals and the need for thorough training of workers are points emphasized.—[From abstr. in Rev. Appl. Entomol.].—Frederick V. Rand.

6101. GARD, M. Les bouillies cuprieuses modifient les propriétés physiques de la surface des feuilles sur lesquelles elles sont appliquées. [Spraying with Bordeaux mixture alters the physical conditions on leaf surfaces.] Rev. Path. Vég. et Entomol. Agric. 10: 332-336. 1923.—Untreated *Vitis* leaves do not wet when it rains, drops of water remaining for a long time unevenly distributed over the surface. Sprayed leaves wet more readily, water spreading as an even film over the whole surface and being soon evaporated. It is suggested that spraying with Bordeaux mixtures containing much lime causes the leaves to dry after rain in a shorter time than is required by mildew conidia to germinate.—J. Dufrenoy.

6102. [HARING, C. M.] Entomology and parasitology. Rept. California Coll. Agric. and Agric. Exp. Sta. 1921-22: 81-88. Fig. 25-26. 1922.—This includes, among other things, reports of experimental studies of forest insects, the relation of leafhopper migrations to the time of sugar beet planting and control of this insect by nicotine dust, the beet leafhopper and curly leaf transmission, pear thrips control, control of red spiders in deciduous orchards, and the insecticidal value of alkaloids from the Solanaceae.—Frederick V. Rand.

6103. HARTLEY, E. A. A useful cage for the rearing of small insects on growing plants. Ohio Jour. Sci. 23: 201-203. 1923.—The cage is made of a rectangular piece of sheet celluloid bent into the form of a cylinder with edges sealed by 95% alcohol. Ventilation holes may be cut before the material is bent and the openings covered with cheese cloth held in place by shellac. Melted paraffin may be poured on the soil around the plant to be used, providing a

smooth, white surface at the bottom of the cage. Coating the edge of the cage thinly with vaseline before placing it on the melted paraffin will prevent its adhering, and will leave a small groove into which the cage may be repeatedly replaced. These cages, unlike glass, do not sweat or concentrate heat.—[From abst. in Rev. Appl. Entomol.]—*Frederick V. Rand.*

6104. HERRMANN. [Rev. of SORAUER, PAUL. Edited by G. LINDAU, in coöperation with E. KÖHLER, D. R. LAUBERT, W. WOLLENWEBER, AND H. ZILLIG. *Handbuch der Pflanzenkrankheiten*. [Handbook of plant diseases.] 4th ed., Vol. 3. *Die pflanzlichen Parasiten*. Part 2, vi + 310 p., 55 fig. Paul Parey: Berlin, 1923 (see Bot. Absts. 12, Entry 6595).] Deutsch. Forstzeitg. 39: 8-10. 1924.—The work as a whole is highly commended. Laubert errs in saying that *Peridermium Pini* is a form of *Cronartium Asclepiadeum*, for the latter is the alternate form of *P. Cornui*. He is also in error in identifying the bark and needle blister rusts of the pine as varieties (*corticula* and *acicola*) of *P. Pini*, since the two have nothing in common. Several other minor errors and several omissions in citations of important literature are pointed out. [See also Bot. Absts. 13, Entry 5314.]—*W. N. Sparhawk.*

6105. HOUDARD, C. *La pathologie végétale à l'Exposition internationale du centenaire de Pasteur, à Strasbourg*. [Plant pathology at the Pasteur centenary exposition held in Strasbourg.] Rev. Path. Vég. et Entomol. Agric. 10: 273-276. 1923.

6106. JENSEN, HJ. *Ziekten van de Tabak in de Vorstenlanden*. [Tobacco diseases and pests in the Vorstenlanden.] Mededeel. Proefsta. Vorstenland. Tabak 40. 1-171. 58 pl. (many col.), 38 fig. 1919.—Part I. Under diseases caused by fungi and bacteria, the nature of the causal organism, the occurrence, effect, spread, and control are discussed. In each case the colloquial names in several languages as well as the scientific name are given. A bibliography is appended to the discussion of each disease. The following are treated: *Phytophthora Nicotianae*, de Haan (lanas, kaki, boesoek); *Cercospora Nicotianae*, Ell. & Ev. or *C. Raciborskii*, Sacc. & Sydow (patik poetih, frog eye, white speck, pulli); *Erysiphe lamprocarpa* or *Oidium tabaci* (djamoer, aschenkrankheit, alu); *Sclerotia Nicotianae* Oud. et Kon., *S. libertiana* Fuck., or *Sclerotium Rolfsii* (stem rot); *Bacterium solanacearum*, E. F. S. (lier, lengker, tobacco wilt, slime disease, Granville wilt, schleimkrankheit, chancre bacterien, tachigare-byo, kuromushi, ichobyo); and *Bacterium pseudozoogleae* Hon. (zwarte roest). Under diseases the cause of which is unknown are treated: Mosaic (brontong, ginje, peh sim, mosaikkrankheit); Tjakar (which is probably identical with mosaic—a Javan word meaning chicken-feet-marked leaves); kroepoek (a Javan name for a disease causing crinkled leaves); krulziekte (local name for a disease causing the top leaves to become small, bunched, and crinkled); marmer (a disease possibly connected with mosaic); zwarte poepoesziekte (literally the black heart sickness—a disease due to which the heart becomes stunted and cannot grow, although side branches come out from under it); pokziekte (a disease which starts with small flecks on the leaves, which soon run together into rings or zigzag lines, and merge later into larger spots). This disease was first described by Iwanowski in Russia, and ascribed by him to climatic conditions.—In Part II, 22 insect pests of tobacco are described in detail.—Part III is devoted to a discussion of the preparation and application of various formulas for combating diseases and pests of tobacco. Literature is cited. Fourteen formulas with various modifications are given. An index lists the scientific and colloquial names.—*L. S. and W. H. Weston.*

6107. KELSALL, A. *The use of aluminum sulphate in place of copper sulphate in insecticide-fungicide combinations*. Proc. Acadian Entomol. Soc. 1922: 8-17. 1923.—As a result of these experiments it was found that mixtures of aluminum sulphate and lime possessed some fungicidal action. As a repellant for the potato flea-beetle (*Epitrix cucumeris* Har.) these mixtures were slightly less effective than Bordeaux mixture. It is evident that aluminum sulphate-lime mixtures greatly reduce the danger accompanying the use of white arsenic.—[From abst. in Rev. Appl. Entomol.]—*Frederick V. Rand.*

6108. KRISHNA MENON, K. *Prevention is better than cure*. Jour. Madras Agric. Students Union 11: 248-254. 1923.—The prevention of plant diseases is discussed.—A variety of paddy (G. E. B. 24) resistant to blast and ephelis is mentioned. Quarantine and state intervention are necessary for more effective control.—*P. S. Jivanna Rao.*



6109. LARUE, CARL D. **Two unreported parasites of *Hevea brasiliensis*.** Papers Michigan Acad. Sci. 2: 69-71. 1923.—In Sumatra a species of *Sclerotium*, similar to *S. Rolfsii*, attacks the surface of the bark of *Hevea brasiliensis* exposed by the tapping process. Bark exposed more than 2 months previously is not subject to attack, being protected by the development of a corky layer. *Cephaleuros virescens* Kunze is common in Sumatra on the twigs of the same host, but only on trees lacking in vigor. This alga rarely fruits on the twigs of this host but fruits in exceeding abundance on *Graptophyllum pictum* (L.) Griff. On the leaves of *Hevea brasiliensis* this parasite is much more abundant than on the twigs and fruits abundantly there. The parasite evidently spreads to the *Hevea* from the surrounding jungle or the native villages where it is found on the mango (*Mangifera indica*) and other plants.—Ernst A. Bessey.

6110. LOVETT, A. L., AND H. P. BARSS. **Insect pests and diseases of bramble fruits.** Oregon Agric. Exp. Sta. Circ. 45. 1-16. 8 fig. 1923.—A brief discussion of symptoms, cause and control of a number of bramble fruit diseases is given. Diseases mentioned include anthracnose (*Plectodiscella veneta*), crown-gall (*Bacterium tumefaciens*), raspberry rust (*Phragmidium*), orange rust (*Kunkelia nitens*), winter injury and a bud blight on prostrate loganberry vines.—C. E. Owens.

6111. LOVETT, A. L., AND H. P. BARSS. **Insect pests and diseases of currants and gooseberries.** Oregon Agric. Exp. Sta. Circ. 42. 1-12. 6 fig. 1923.—In addition to insect pests there are several fungous diseases of these fruits, namely, powdery mildew, anthracnose, and die-back troubles caused by a species of *Botrytis* and by *Plowrightia Ribesia*. Attention is called to the fact that white pine blister rust is now known to occur in the Pacific Northwest, although not yet reported from Oregon. Control measures are recommended for the powdery mildew (*Sphaerotheca mors-uuae*) and anthracnose (*Pseudopeziza Ribis*), and it is pointed out that the cultivated black currant has been declared a public nuisance and its planting and cultivation forbidden.—C. E. Owens.

6112. PAILLOT, A. **Les Maladies bactériennes des insectes. [Bacterial diseases of insects.]** Ann. Epiphyties 8: 95-291. 8 pl., 89 fig. Paris, 1922.—A study of microorganisms parasitic upon insects was taken up some years ago at a time when the knowledge of this subject was in a state of confusion, with the result that little success was then attained. The study has been resumed on a more rational and solid basis. The technique of these experiments is detailed and the systematic position of certain entomophytous microorganisms is discussed.—The method of infection of insects with bacteria and the possibility of artificial dissemination have also been studied. The question of insect immunity and the theories regarding phagocytosis and humoral reactions are considered. One of the conclusions reached is that the bacterial parasites of a given insect vary more or less in form, thus rendering their classification difficult. The virulence of the microorganism does not increase regularly with each successive passage through the same host, but is influenced by various factors that are but little understood and vary greatly among different individuals. Contamination by the mouth parts cannot be effected, even with the most virulent species, either in the laboratory or in nature; the creation of artificial epidemics is therefore a technical impossibility, according to our present knowledge.—Immunity can be produced in insects by methods similar to those used in vertebrates; it is attained much more rapidly but is more evanescent and seems to be caused by physico-chemical modifications of the composition of the blood and of the bacterial substance.—[From abst. in Rev. Appl. Entomol.]—Frederick V. Rand.

6113. PARKER, T. **The suppression of insect pests and fungoid diseases. 2. The fumigation and disinfection of glasshouses.** Bur. Biotech. Bull. 8. 244-248. 1923.—As soon as the growing of a particular crop is over, the house should be thoroughly fumigated, care being taken to use a fumigant that will kill not only hibernating insects, but also their eggs. It is considered doubtful whether cyanide gas, nicotine and the other commoner fumigants fulfil this purpose, but successful results have been obtained with a fumigant one of the active ingredients of which is a chlorinated nitro compound. After removal of all detritus the soil should then be sterilized. The latter step often cannot be taken if another crop is to be planted at once, but soil sterilization should be carried out at least once a year, preferably a fortnight before planting. Sterilization may be by steam, dry heat or chemicals. Chlorinated compounds such as chlorocresol, chloropicrin, etc., are much more effective than or-

dinary cresylic acid. The house should then be disinfected by washing down all interior surfaces with lime wash.—[From abst. in Rev. Appl. Entomol.]—*Frederick V. Rand.*

6114. PARKER, T., AND A. W. LONG. **Spray spreading agents.** Bur. Biotech. Bull. 8. 252-258. 2 pl., 6 fig. Leeds, 1923.—Many materials, such as soap, saponine, quillaia bark, glue, borax, etc., have been used to increase the spreading capacity of spray fluids. The use of soap is somewhat restricted owing to the chemical reactions that may occur between it and some of the ingredients of insecticides and fungicides. Saponine often gives good results but is expensive. This paper deals with the results of experiments with alkaline caseinates, and particularly with calcium caseinate which greatly increases the wetting and penetrating power of a spray. A 0.2% solution of calcium caseinate is approximately the lowest strength that will produce maximum wetting. It greatly retards the settling out of lead arsenate and appears to increase the insecticidal and fungicidal efficiency of some sprays by 100% when these are compared with similar concentrations in ordinary water. The results seem to indicate that a winter spray of lime-sulphur in conjunction with calcium caseinate might be successfully carried out at a dilution of 1-40 instead of the usual 1-20 strength.—[From abst. in Rev. Appl. Entomol.]—*Frederick V. Rand.*

6115. PHILLIPS, J. F. **Research: Indigenous forests. No. 1. Disease in young natural regeneration of *Olea laurifolia* Lem.** South African Jour. Nat. Hist. 4: 209-220. 1923.—A brief general description of the flowering and fruiting aspects of *Olea laurifolia* Lem. is given, with notes on the migration of the fruits and their viability. Certain major diseases of the regeneration are dealt with in general terms, and the influences of the respective fungous and insect diseases are indicated. The paper is introductory to a fuller study of regeneration in *Olea laurifolia*.—Examination of the indigenous forest by intensive quadration methods shows the grave lack in certain age (girth and height) classes in some species. Three major factors are perhaps accountable for such a state of affairs, viz., (1) past and present errors in silvicultural treatment of the forest, (2) diseases due to fungi, bacteria and insects, and (3) unfavourable direct factors such as water-content, humidity, light, and temperature of the habitat.—*L. J. Goldblatt.*

6116. POLE EVANS, I. B. **Annual report of the Department of Agriculture. Report No. VI.—Botany and plant pathology.** Jour. Dept. Agric. Union South Africa 7: 550-552. 1923.—Wart disease of potato and citrus canker are both being kept well in check, no fresh infections having been reported since last year. Mosaic, mottling, or yellow strip disease of sugar-cane is widespread in Natal, though Uba, the staple variety, is apparently immune to this disease.—An unrecorded rot of Jerusalem artichokes which was partially investigated was found to be due to a fungus of the nature of an *Acremonium* sp.—In connection with the Botanical Survey important researches on the physiology and ecology of plants were carried out, including "a new calcium chloride method of measuring resistance to water loss in leaves" and the "hydrogen ion concentration in various Natal soils." At the Botanical Station it was found that the exotic clovers and Kikuyu grass benefit mutually when grown in combination.—*L. J. Goldblatt.*

6117. PUTTERILL, V. A. **Plant diseases in the Western Cape Province XI.** Jour. Dept. Agric. Union South Africa 7: 403-406. 4 fig. 1923.—This is a note on a case of gumming in the fruit of the Bitter Seville orange, due probably to an exceptionally dry summer and autumn. Later fruits on the same tree were in every way normal. In a note on the black scurf (*Coniothecium chomatosporum* Cord.) of citrus trees, the writer states that this disease is probably often mistaken for thrips injury.—*L. J. Goldblatt.*

6118. RAMBOUSEK, FR. **Škudcové a choroby semene a mladých rostlin řepných. [Diseases of beet seedlings.]** Ochrana Rostlin 2: 31-32. 1922.—Fertilization with calcium cyanamide kainit, or super-phosphate is recommended for the prevention of beet seedling rots. Seed treatment with sulphuric acid hastens germination and lessens exposure to root rots. Seed from plants with heart rot are particularly likely to yield plants affected by root rot. Over-manuring favors root diseases. Nematodes may cause dwarfed plants with dead root-tips.—*E. Baudyš.*

6119. RIEHM, E. **Vorschläge für eine Einwandfreie Begutachtung von Pflanzenschutzmitteln. [Proposal for a satisfactory expert opinion on fungicides and insecticides.]** Rept. Internat. Conf. Phytopath. and Econ. Entomol. Holland. P. 131-135. H. Veennan & Sons:



Wageningen, 1923.—The article is a discussion of J. Bernátsky's paper [See Bot. Abst. 13, Entry 6096] giving some additional points. The author advises setting up in different regions authorized stations which in coöperation with the representatives of phytopathology or applied entomology should work out an expert opinion on means of plant protection and maintain a high scientific standard. A particular decision is useless unless one has a guarantee that the substance in question will always be used in commerce with the same chemical composition as that which has been tried out.—*Lillian C. Cash.*

6120. ROBINSON, R. H. **The preparation of spray materials.** Oregon Agric. Exp. Sta. Bull. 201. 1-15. 1924.—"This bulletin outlines methods of procedure for the preparation of sprays, emphasizes precautions that should be taken in the selection of materials from which sprays are prepared, and advises on safe mixtures that may be used in combination sprays.—Methods are given for the preparation of lime-sulfur solution, self-boiled lime-sulfur, Oregon cold-mix lime and sulfur, New Jersey dry-mix lime and sulfur, bordeaux mixture, 'boiled' lubricating oil emulsion, and three different formulas for 'cold' lubricating oil emulsions."—*C. E. Owens.*

6121. ŠINDELÁŘ, L. **Rostlinolékařství.** [Plant pathology.] Moravský Hospodář 1922: 24-26, 36-44. 1922.—A short popular exposition of plant pathology is illustrated by estimates of various authors relative to damage by plant diseases in Bohemia as follows: Bunt of wheat, 2%, other cereal smuts, 1%; diseases of potatoes, 10%, of oats, 15-20%; wheat leaf rust, 30%, apple leaf roller, 20%.—*E. Baudyš.*

6122. SMITH, E. H. **Some diseases new to California.** [Abstract.] Phytopathology 14: 125. 1924.

6123. SMITH, RALPH E. **Recent advances in dusting methods.** [Abstract.] Phytopathology 14: 121-122. 1924.

6124. SURCOUF, J. M. R. **Recherches sur la biologie du Phoenix dactylifera. Étude sur la culture, les maladies et les parasites du palmier dattier en Algérie.** [Researches on the biology of *Phoenix dactylifera*. A study of the culture, diseases and parasites of the date palm.] Bull. Soc. Hist. Nat. Africa Nord 13: 293-312. 1922.—The disease called "baioud" or white disease is characterized by rapid death of the palm and interior putrefaction. It is cryptogamic in origin [organism not stated] and is transmitted by irrigation water. The disease called "doud" is connected with Coleoptera larvae, including *Phyllognathus silenus*. Death of the tree takes place progressively from summit to base. Control measures include cutting back of the upper leaves and the top of the tree until healthy wood is reached. The fruit disease called "n'faroun" is characterized by a brown discoloration followed by drying up and desquamation of the epidermis. It is probably of cryptogamic origin.—*Harry Braun.*

## PHARMACOGNOSY AND PHARMACEUTICAL BOTANY

HEBER W. YOUNGKEN, *Editor*

E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 5957, 6179, 6201)

6125. COFMAN-NICORESTI AND SNOW B. TALLANTYRE. **The international standardization of Quillaia preparations.** Pharm. Jour. 111: 103-104. 1923.—The bark of *Quillaia Saponaria* is official in most pharmacopoeias, though in the French Codex the bark of *Q. Smegmadermous* is recognized and in the Mexican Pharmacopeia both species are mentioned. Three other kinds of quillaia have been described, *Q. Peppigi* Walpers, *Q. Lancifolia* Don, and *Q. Brasilensis* Martius. It should be mentioned, however, that Reich considered *Q. Saponaria*, *Q. Peppigi*, and *Q. Smegmadermous* as different varieties of the same species due to variations in growth conditions. The usual preparations of quillaia are the extract and the tincture. The drug is also used in preparing certain emulsions. The assay of quillaia indicates 8.98 to 10.78% saponin in the dried bark. Hence a suitably prepared tincture (1 in 5) might be expected to contain 1.8 to 2% saponin. From chemical and botanical investigations there appears no reason for giving preference to

any one species or variety of quillaia. Extracting the bark with water and subsequently adding alcohol seems the most rational method of preparing the tincture.—*E. N. Gathercoal.*

6126. GREENISH, HENRY G. **A visit to an herb farm.** *Pharm. Jour.* 110: 583-584. 3 fig. 1923.—Medicinal herb growing in England is practiced particularly to obtain drugs for use undried or to obtain those of exceptional quality. The chief medicinal plants grown on the farm visited at Long Melford are lavender, peppermint, rhubarb, henbane, belladonna, foxglove, aconite, chamomiles, violas, dill, rosemary, pennyroyal, savin, stramonium, and valerian. Varieties, and methods of growing, gathering, treatment for use, etc., are given.—*E. N. Gathercoal.*

6127. HOLMES, E. M. **Cascara sagrada.** *Pharm. Jour.* 110:314. 1923.—Practically the only remaining growth of wild *Rhamnus purshiana* is in western British Columbia, as the extensive growths of California, Oregon, and Washington are rapidly being depleted. An important feature of the British Columbia beds is that no other similar species of *Rhamnus* occurs there, such as the *R. californica* of the lower Pacific coast. An effort is being made in British Columbia to establish proper curing and pharmaceutical extraction plants in order to reduce exportation of the drug as such and to localize the industry. A campaign of education is also being launched in order to preserve the large amount of Cascara bark that is now burned in clearing for agricultural purposes. An effort is being made to reseed the cut-over areas with Cascara, which in cultivation produces plants large enough to strip within 15 years. Clay loam with plenty of moisture and fairly good drainage is essential. The plant could be cultivated to advantage in many forest regions of England.—*E. N. Gathercoal.*

6128. HOOPER, E. S., AND K. M. KING. **The international standardization of Colchicum preparations.** *Pharm. Jour.* 111: 104-106. 1923.—The 4 preparations of colchicum (tincture, extract, wine, and vinegar,) from dried seed, dried corm, and fresh corm, as official in 22 pharmacopoeias, are reviewed. The tincture, apparently the most uniform preparation, is made from the seed 1 in 10 per cent by percolating with 70% alcohol, and, according to U. S. P., should contain 0.036-0.04% of colchicine. The extracts, wines and vinegars are made from corm or from seed. The authors state that a great uniformity in these preparations is desirable.—*E. N. Gathercoal.*

6129. JONES, A. J. **International standardization of Belladonna and its preparations.** *Pharm. Jour.* 111: 106-110. 1923.—Belladonna, either leaf or root, or both, is official almost universally. It is obtained from *Atropa belladonna* and very largely from cultivated plants. A wild form, *A. lutescens*, grows in the Himalayas. The drug is occasionally adulterated with *Phytolacca decandra*, *Ailanthus glandulosa*, *Scopola atropoides*, *S. carniolica*, *Solanum carolinense*, *S. nigrum*, *Hyoscyamus muticus*, *Solandra longiflora*, and *Carpinus Betulus*. The drug is evaluated by alkaloidal assay. There are 3 preparations: (1) Juice of aqueous extract of fresh leaf or herb; (2) alcoholic extract of leaf or herb; and (3) alcoholic extract of root. It has been shown that almost identical yields of alkaloids from the same specimen may be obtained by extracting with alcohol varying from 80-40%, though 70% is generally used. Alkaloidal content of the extract varies from 0.5-2%, and a number of pharmacopoeias do not require an alkaloid standard. The actual methods of assay need to be more closely correlated. Greater precision is required and methods for isolating and determining atropine and hyoscyamine are needed.—*E. N. Gathercoal.*

6130. MUSZYNSKI, JAN. **The collection of Lycopodium in Poland.** *Pharm. Jour.* 110: 64-66. 1923.—While the spores of *Lycopodium* are recognized in nearly all pharmacopoeias and decoctions of the plants have been used by the inhabitants of Scandinavia, the Baltic lands, Russia and Poland for various diseases since the time of the Druids, yet by far the greater quantity is consumed for technical purposes, about 160,000 kilos being produced annually before the war. The spores are collected in the wooded areas of northeastern Poland from *L. clavatum* and occasionally *L. complanatum*, the spikes and spores of these 2 species being very similar. The fresh spikes collected by the villagers in July and August are sold to local agents who dry them, usually without artificial heat, for 7 to 14 days and then shake out the spores through ordinary flour sieves. This crude powder still retains from 5 to 10% of extraneous matter consisting of leaves, scaly fragments, sand and a slight quantity of wheat or rye starch. When the perfectly ripe spikes alone are collected the yield of pure



Lycopodium spores is about 23% of fresh material. It is possible for good collectors to gather three kilos or more of ripe clean spikes in a ten-hour day.—*E. N. Gathercoal.*

6131. OFFNER, J. À propos de recherches récentes sur la toxicité de *Volvaria gloiocephala*. [Recent researches on the toxicity of *V. gloiocephala*.] Compt. Rend. Soc. Biol. 88: 801-802. 1923.—The author states that the toxicity of a mushroom, such as *Volvaria gloiocephala* (DC.) Quel. [identical with *V. speciosa* (Fr.) Quel.], can not be judged by its hemolytic power, further that the effect on animals is not a criterion of much value.—*Oran Raber.*

6132. PAMMEL, L. H. Hay fever produced by marsh elder or cattle weed. Vet. Med. 19: 221-222. 1924.—Marsh elder, *Iva xanthiifolia*, is unquestionably a frequent cause of hay fever.—*C. D. Marsh.*

6133. PAMMEL, L. H. Rape poisoning. Vet. Med. 19: 52-53. 1924.—Losses of calves supposed to be from rape poisoning are described. More such cases, usually caused by rape seed, are reported from Europe than from the United States.—*C. D. Marsh.*

6134. PAMMEL, L. H. Rattle Box. Vet. Med. 19: 52. 1924.—A description of symptoms of *Crotalaria* poisoning as seen in Africa is quoted from ARNOLD THEILEN, and one from M. STALKER of similar poisoning cases in America.—*C. D. Marsh.*

6135. PAMMEL, L. H. Tall cone flower suspected. Vet. Med. 19: 222-223. 1924.—*Rudbeckia laciniata* is suspected of being poisonous to hogs and cattle.—*C. D. Marsh.*

6136. PAMMEL, L. H. Three seeded mercury from Oklahoma. Vet. Med. 19: 222. 1924.—A description is given of symptoms in two horses supposed to have been poisoned by *Acalypha ostryaefolia*.—*C. D. Marsh.*

6137. PHILLIPS, E. P. Note on a little-known poisonous plant. Jour. Dept. Agric. Union South Africa 7: 366-368. 1 fig. 1923.—The author discusses the medicinal and poisonous properties of members of *Thymeleaceæ*. He cites experiments with cattle to show that *Lasiosiphon anthylloides* Meisn., of wide distribution in South Africa, possesses toxic properties, but that this plant is probably only responsible for isolated cases of poisoning as cattle eat it only in seasons of drought.—*L. J. Goldblatt.*

6138. SMITH, A. BERNARD. Poisonous plants of all countries. 2nd ed., xii + 112 p., 185 fig. Bailliere, Tindall & Cox: London, 1923.—The author describes the poisonous plants found in various parts of the world, giving in each instance the family, synonyms, diagnostic characteristics, and toxic principles. The plants are classified under the following captions: (1) Poisons acting on the brain (narcotics, delirants, inebriants); (2) poisons acting on the spinal cord (convulsives); (3) poisons acting on the heart (depressants, asthenics); (4) irritant poisons (purgatives, irritants with nerve symptoms, simple irritants); and (5) specific irritants (microfungi and bacteria). The appendix contains a list of plants reputed to be poisonous, together with their synonyms and toxic principles. A list of plants causing *Dermatitis venenata* and a 2 page glossary are also given.—*H. W. Youngken.*

6139. STEVENEL. Note préliminaire sur la découverte d'un principe actif dans l'huile de *Chaulmoogra*. [Preliminary note on the discovery of an active principle in *Chaulmoogra* oil.] Bull. Soc. Path. Exotique 17: 108. 1924.—An unstable alkaloid, toxic to lizards and rats, was isolated.—*Philip Brierley.*

6140. STEVENS, H. B. The international standardization of opium and its preparations. Pharm. Jour. 111: 110-113. 1923.—Opium, one of the first drugs to be assayed, has received more attention in the matter of international standardization than any other drug. The author presents tabulations of the preparations of opium official in the pharmacopoeias of the 16 countries represented in the international agreement respecting the unification of the pharmacopoeial formulas for potent drugs at Brussels, 1906. There is a rather general agreement as to the official methods of assay, though the differences are still so marked that the need of a uniform international assay for opium is very great.—*E. N. Gathercoal.*

## PHYSIOLOGY

B. M. DUGGAR, *Editor*W. J. ROBBINS, *Assistant Editor*

(See also in this issue Entries 5637, 5642, 5719, 5725, 5740, 5836, 5909, 5949, 5985, 6020, 6035, 6041, 6088, 6089, 6092, 6116, 6131, 6253, 6281, 6287, 6289, 6291, 6308, 6324)

## GENERAL

6141. HARRIS, D. FRASER. A defence of philosophic neo-vitalism. *Scientia*. 35: 259-268. 1924.

## PROTOPLASM, MOTILITY

6142. CATALANO, G. La sensibilita vegetale (Sintesi storica delgi studio piu notevoli.) [Sensitivity in plants; an historical study.] *Nuovo Gior. Bot. Ital.* 30: 121-157. 1923.—This is a critical historical review of the structure of the organs of sensitive plants, the transmission of stimuli and the concept of plant sensitivity.—*Ernst Artschwager*.

6143. KAHRO, H. Über die Einwirkung von Säuren auf die Hitzegerinnung des Pflanzenplasmas. [The effect of acids on the coagulation of plant protoplasm by heat.] *Biochem. Zeitschr* 144: 104-114 1924.—The temperature at which the protoplasm of *Zebrina pendula* and *Viola tricolor* was coagulated in isotonic solutions of neutral salts was lowered by weak concentrations of HCl, HNO<sub>3</sub> and oxalic acid. This effect was most apparent at the I end of the lyotropic series and decreased gradually in the direction, CNS→SO<sub>4</sub>. For cations the effect varied in the order K>Na>Li>Mg>Ca. The action of acids in lowering the coagulation temperature is considered a permeability phenomenon as it depended on the amount and rapidity of penetration. The salts that increased the absorption of acids were the salts that promote swelling of colloids and *vice versa*—*H. D. Hooker, Jr.*

6144. METZNER, P. Zur Mechanik der Geisselbewegung. [The mechanics of flagella movement.] *Biol. Centralbl.* 40: 49-87. 18 fig. 1920.—The purpose of this investigation was to define the field of application of Buetschli's "contraction-line propeller theory" of flagella movement and to test by experiment the objections which have been made to this theory. Mechanical models of flagella, such as stiff straight wire bent at various angles, curved wires, screw-shaped forms as well as various types of elastic models, were revolved in water and viscid fluids and the propelling effect measured. The direction and intensity of the arising currents are depicted. The experimental results agree with a brief mathematical discussion of the main factors involved. The vibratory field in elastic non-circular models shows elliptical cross section. Very elastic models assume passively on revolution characteristic screw-shaped forms with spiral gradient and amplitude of oscillation dependent on the speed of rotation. In the discussion of living objects which follows, the movement of the flagellata is ascribed to a pure conical vibration, by which the organism "sucks" its way into the water. *Chromatium Okeni* is found to be the only case of an active flagellum-screw in the sense of Buetschli. The flagella of Chromatia and Spirilla are composed of numerous contractile individual flagella, firmly united in Chromatia but separable in the Spirilla.—*C. J. Kullmer*.

6145. SEIFRIZ, WILLIAM. Reaction of protoplasm to salts and antagonistic action of salts and alcohol. *Bot. Gaz.* 76: 389-402. 1923.—The author finds that K, Na, and Ca increase the osmotic value of the leaf cell of *Elodea*. The same 3 ions cause no stimulation to streaming after short treatment and ultimately stop all streaming. Sr, Ba, and Cu decrease the osmotic value of the *Elodea* leaf cell owing to exosmosis due to an increase in permeability. These 3 ions stimulate protoplasmic streaming. The results obtained by this plasmolytic method of experimentation indicate that elements which are of the same chemical class are not therefore necessarily of the same physiological class, as determined by their effect on protoplasm. The valency hypothesis of the diffusion of ions through the protoplasmic membrane is believed not to hold strictly. From the ex-



periments with salts and ethyl alcohol the writer finds that NaCl acts as an antagonizer to the alcohol, a 0.128 M. concentration of NaCl successfully antagonizing a 10% solution of alcohol.  $\text{CaCl}_2$  showed no antagonistic activity whatever to alcohol. The most perfect antagonizer of 10% alcohol was found to be a combination of NaCl and  $\text{CaCl}_2$ . With regard to the phenomenon of antagonism, the author inclines to the theory that opposite effects are produced in the protoplasm by the 2 reagents used. A suggestion presented by Chodat is "that by virtue of Gibb's law, the Na and Ca ions occupy different regions in the cell, whence the additive protective effect of the 2 when in solution together. If the monovalent ion is more in the periphery and the bivalent ion more toward the center, this would explain why the Ca ion when alone is unable to exercise any inhibitory influence.—B. W. Wells.

### DIFFUSION, PERMEABILITY, PHYSICO-CHEMICAL PHENOMENA

6146. BRINKMAN, R. UND A. V. SZENT-GYÖRGYI. Studien über die physikalisch-chemischen Grundlagen der vitalen Permeabilität. IV. Die Kapillaraktivität des Sauerstoffs und der Kohlensäure an der Grenzfläche Petroläther-Wasser. [The physico-chemical bases of vital permeability. The capillary action of oxygen and carbon dioxide at the boundary between petroleum ether and water.] Biochem. Zeitschr. 144: 47-51. 1924.— $\text{O}_2$  and  $\text{CO}_2$  showed specific action in reducing the surface tension at the boundary between petroleum ether and water.—H. D. Hooker, Jr.

6147. DOYON, M. Action défavorable de la nicotine et de quelques autres substances sur la formation de certaines plantes artificielles d'origine osmotique. Action de la température. [The unfavorable action of nicotine and some other substances on the formation of osmotically formed artificial plants. The effect of temperature.] Compt. Rend. Soc. Biol. 88: 1126-1127. 1923.—Directions are given for producing osmotically formed artificial plants. This growth is hindered by a trace of nicotine. The effect of many other organic compounds is studied, such as pyridine which hinders the growth and alcohol which has no effect. Room temperature is best. At  $38^\circ$  there is no growth and at  $8^\circ$  the growth is flattened.—Oran Raber.

6148. REBELLO, SILVIO. La diffusion périodique des sels mercuriels insolubles et la réaction du sulfure d'ammonium sur les milieux formolés. [The periodic diffusion of insoluble mercury salts and the reaction of ammonium sulphide on media with formalin.] Compt. Rend. Soc. Biol. 88: 1336-1338. 1923.—A phenomenon analogous to the formation of Liesegang rings is described.—Oran Raber.

6149. REBELLO, SILVIO. Sels mercuriels "insolubles" et protéines. ["Insoluble" mercury salts and proteins.] Compt. Rend. Soc. Biol. 88: 1331-1333. 1923.—The formation of insoluble protein salts with Hg compounds is described.—Oran Raber.

6150. STEARN, ESTHER W., AND ALLEN E. STEARN. The mechanical behavior of dyes, especially gentian violet, in bacteriological media. Jour. Bact. 8: 567-572. 1923.—The basic dye, gentian violet, was taken up by bacterial protoplasm only in alkaline solutions while in acid solutions the acid dyes, ponceau and acid fuchsin, combined with the bacteria. The author notes that this is in accordance with Loeb's theory of the amphoteric nature of proteins, which would also possibly explain the confusing phenomena of the Gram stain and the selective bactericidal properties of dyes.—C. E. Skinner.

### WATER RELATIONS

6151. HARDAKER, P. Researches on the vegetation of Natal. Series 1, Section IV. Some experiments on the rate of water loss during the drying of leaves. Mem. Bot. Surv. South Africa 5: 44-56. 1 fig. 1923.—Experiments on the rate of drying of detached leaves of various species indicate (1) that succulents have a greater power of resisting water-loss and consequently are able to maintain a large water-balance for a much longer period than non-succulents, (2) that leaves of *Podocarpus* sp. are more resistant to water-loss than are dicotyledonous leaves, even though the latter are from plants growing in much drier and more exposed stations.—Leaves of dicotyledonous plants vary considerably in the abundance and arrangement of their woody tissues. In some, the lamina of the leaf is divided into a

few large "islands" of soft tissue by the lateral veins, while in others it is divided into numerous minute "islands." In the experiment described, leaves with large "islands" of soft tissue show the highest rate of loss. Leaves with numerous small "islands" usually show low rates of loss, but this is not invariably the case.—*L. J. Goldblatt.*

6152. HOWES, F. *Researches on the vegetation of Natal. Series 1, Section II. A new calcium chloride method of measuring the resistance to water-loss in leaves.* Mem. Bot. Surv. South Africa 5: 23-33. 2 fig. 1923.—A new method of measuring water-loss from leaves, depending on the use of small tubes of  $\text{CaCl}_2$  attached directly to the leaf surface instead of being placed under bell-jars, is described. A special clip for holding the tubes in position is also described. Critical experiments on the method indicate that (1)  $\text{CaCl}_2$  retains its efficiency as an absorber of water over reasonably long periods even when used in small quantities only; (2) the results obtained are not affected by variations in the amount of  $\text{CaCl}_2$  in the tubes (within reasonable limits) nor in the proximity of the  $\text{CaCl}_2$  to the leaf surface.—The method measures, not the actual transpiration of a leaf, but its power of resisting water loss. Examples of the application of the method are given. Leaves in bright sunlight are less resistant to water-loss than leaves in shade, while young and old leaves also differ.—*L. J. Goldblatt.*

6153. LEPESCHKIN, W. W. *Über aktive und passive Wasserdrusen und Wasserspalten. [Active and passive water glands and water stomata.]* Ber. Deutsch. Bot. Ges. 41: 298-300. 1923.—The force involved in guttation may be sap pressure (Blutungsdruck) or it may come from epidermal structures. The guttation caused by sap pressure may occur through water stomata or through ordinary stomata. Guttation does not occur through water stomata when the edge of the leaf bearing the stomata is cut off and laid with its cut surface in water. The author considers guttation through water stomata to be due to sap pressure and not to the activity of the cells of or near the stoma. Guttation by multicellular epidermal structures such as hairs (leaves of *Phaseolus multiflorus*, *Abutilon*, and in some *Malvaceae* and *Tiliaceae* and pods of *Lathyrus*; conical protrusions on *Carnellia*, *Thea*, and *Escallion microphylla*) is due to the structures themselves. On a piece of tissue with the cut surface touching water, guttation continues.—*W. J. Robbins.*

#### MINERAL NUTRIENTS AND SALT RELATIONS

6154. ALLISON, R. V., AND J. W. SHIVE. *Studies on the relation of aëration and continuous renewal of nutrient solution to the growth of soybeans in artificial culture.* Amer. Jour. Bot. 10: 554-566. 1 pl., 2 fig. 1923.—Soybeans were grown in sand cultures and solution cultures subject to 4 treatments as follows: Series I: Simple non-aërated cultures. Solutions renewed every 3½ days. Series II: Simple aërated cultures. Like I, but aërated by a continuous bubbling of air through the medium. Series III: Drip cultures. Solutions continuously renewed, but not aërated. Series IV: Aërated drip cultures. Like III, but aërated by a continuous bubbling of air through the medium.—The apparatus for aërating cultures and renewing solutions is described. Quantitative determinations of the dissolved  $\text{O}_2$  content were made in the case of the solution cultures. A continuous solution renewal always produced plants superior in every respect to those grown in cultures with intermittent solution renewal. The best plants grew where constant and thorough aëration took place. Aëration in solutions renewed intermittently had no apparent influence on growth of tops but increased root development. Aëration in cultures with continuous renewal increased both tops and roots. Continuous solution renewal alone did not maintain the supply of dissolved  $\text{O}_2$  necessary for maximum growth. Response of roots to aëration was much more pronounced in continuously than in intermittently renewed solutions. The superiority of roots grown in aërated media was shown not only in greater weight but in the development of very efficient absorbing systems. Yields from sand cultures were uniformly superior to those from solution cultures. The changes in pH in culture solutions during plant growth were observed and recorded. Aëration was found to have no effect on this, but the intermittently-renewed cultures differed considerably from the constantly-renewed ones. In all cases the initial value of about pH 4.6 was changed to a point near neutrality.—*E. W. Sinnott.*



6155. STEINBERG, R. A. **Effect of zinc and iron compared with that of uranium and cobalt on growth of *Aspergillus*.** Bot. Gaz. 70: 465-468. 1920.—The author's previous results demonstrating the marked increase (1000-3000%) in growth of *Aspergillus niger* obtained by addition of salts of both Fe and Zn to the nutrient solution are confirmed. Comparison of their effects with those of 2 other "stimulative" elements selected at random is made. Cobalt and uranium salts, when substituted for either Fe or Zn result in greatly diminished (1000-3000%) growth, thus showing a fundamental difference between the effects of Fe and Zn and the effects of the other "stimulative" elements. It is concluded, therefore, that Fe and Zn are essential for the growth of *A. niger* and the suggestion is made that the action, if any, of the other "stimulative" elements may be through supplementing the action of Fe and Zn, when these are present in favorable suboptimal amounts, by internal or surface increase in acidity of the organism.—*Author*.

6156. TRELEASE, SAM F., AND BURTON E. LIVINGSTON. **The relation of climatic conditions to the salt proportion requirement of plants in solution cultures.** Science 59: 168-172. 1924.—A pure line of "Marquis" spring wheat was grown for 28 days in 8 very different solutions simultaneously in a green house and in an artificially lighted basement room. Seeds and seedlings were selected for uniformity, 3 gallon, glazed earthenware pots were used for culture vessels with 40 plants per culture, the solutions were changed every 2 days, and the culture vessels stood on a rotating table. Top dry weights were determined and the experiment was repeated. For the 2 sets under continuous illumination where the aerial environment did not differ markedly a satisfactory duplication was secured. In the 2 sets in the greenhouse the standard solution gave a 36% greater yield in the 2nd experiment but the relative values in the solutions of a given set were not much changed. It is suggested that a greater difference in climatic complexes might be sufficient to change both actual and relative values. However even with the considerable climatic difference between the greenhouse and the basement room the best 3 solutions and the poorest solution were the same. The relative physiological values of different nutrient solutions compared repeatedly under different climatic complexes may be the same or more or less different for the several tests depending upon the nature and magnitude of the climatic differences.—*W. J. Robbins*.

### METABOLISM (GENERAL)

6157. ARCHIBALD, J. G. **The effect of sodium hydroxid on the composition, digestibility and feeding value of grain hulls and other fibrous material.** Jour. Agric. Res. 27: 245-265. 1924.—Oat, barley, rice and cottonseed hulls and flax shives were treated by Beckmann's process with cold, dilute NaOH. The effect on the composition and digestibility of the materials was determined, the former by analyses, the latter by digestion experiments with sheep. The treatment decreased all proximate constituents except crude fiber which was relatively increased. The digestibility of oat hulls was about doubled by the treatment; that of barley hulls showed considerable increase. Rice hulls showed the most marked improvement of any material investigated but due to the woody, gritty character of the original material the treated product did not approach in value even the untreated oat hulls. The treatment had practically no effect on the cottonseed hulls and flax shives. An extensive review of the literature of fiber hydrolysis is included.—*Author*.

6158. AUSTIN, W. C. **Phospholipins in yeast.** Jour. Biol. Chem. 59: Proc. III. 1924.

6159. BERZELER, L., AND H. WASTL. **Über Farbe und Dispersitätsgrad. II. [Color and dispersion.]** Biochem. Zeitschr. 144: 170-174. 1924.—The color produced by treating starch with I is considered dependent on the degree of dispersion of the starch, the red color produced with dextrin being associated with smaller particles. Treatment with Br and Cl induces color changes in starch solutions colored blue with I similar to those produced by hydrolysis; the solution is colored red when an equivalent amount of I and the other halogens is present; when the latter is doubled in amount the color disappears. The color change in the transformation of  $\text{Cu}(\text{OH})_2$  to  $\text{CuO}$  also is considered to be associated with the degree of dispersion, the black  $\text{CuO}$  being composed of larger particles which have no tendency to become colloidal. Bivalent anions accelerate the change more than monovalent anions. Cellulose ethyl ether is a protective colloid that prevents the change.—*H. D. Hooker, Jr.*

6160. FRANCK, ANNFRIED. Ueber die Harzbildung in Holz und Rinde der Koniferen. [Resin production in wood bark of Conifers.] Bot. Archiv 3: 173-184. 5 fig. 1923.—In all species of *Pinus*, *Picea*, *Abies*, and *Larix* investigated, the wood resin canals are distinguished from the bark resin canals through the lack of a closed sheath. A resin layer is not found in the youngest stages of resin canals either in the wood or bark. Within the epithelial cells, contrary to Tschirch's assumption, there appear droplets which are of the same chemical nature as the resin in the canals. These resin droplets occur in the epithelial cells of the youngest resin canals in every case. In the wood of *Pinus silvestris* they are demonstrable even before the separation of the epithelial cells. In mature bark and wood canals the resin droplets have accumulated in strikingly great quantities. The droplets lie in the secretory zone between protoplast and membrane. In living cells the resin droplets are not recognizable while the protoplast is compressed against the cell wall, but in plasmolyzed cells their presence can be demonstrated with Sudan. The resin droplets are formed only in the epithelial resin passages and not in the bounding sheath or parenchyma cell.—William Seifriz.

6161. KIESEL, ALEXANDER. Zur Frage über das Vorkommen von Ornithin in Pflanzen. [Presence of ornithine in plants.] Zeitschr. Physiol. Chem. 118: 254-266. 1922.—A study of the various methods of precipitating ornithine leads the author to believe that failure to find ornithine is due to the inadequacy of our methods to detect the small amounts which may occur in plants. The necessary conditions for ornithine detection are suggested.—Chas. A. Shull.

6162. KORDES, HERBERT. Biologische Untersuchungen über das in Dauerzellen und Hyphen verschiedener Pilze auftretende Fett. [Investigations on the fat in resting cells and hyphae of different fungi.] Bot. Archiv 3: 282-311. 1923.—The fat occurring in the resting cells of fungi is used during germination and is therefore reserve fat. The fat occurring in hyphae is not used even in starvation cultures. The hyphal fat is therefore an excretion. The chief ingredient of the ether extract of *Daedalea quercina* is resin which constitutes 10% of the dry matter of the fungus.—William Seifriz.

6163. LAQUER, FRITZ. Ein Mikroextraktionsapparat. [A micro-extraction apparatus.] Zeitschr. Physiol. Chem. 118: 215-217. 1 fig. 1922.—A micro-extraction apparatus suitable for extraction of lactic acid from organic fluids is described. It would be just as well suited to micro-determinations of any ether-soluble substances.—Chas. A. Shull.

6164. MAGNESS, J. R., AND H. C. DIEHL. Physiological studies on apples in storage. Jour. Agric. Res. 27: 1-36. 15 fig. 1924.—In these studies the literature concerning the chemistry and physiology of the ripening processes in apples has been reviewed and correlated with investigations on the storage life of the fruit made by the authors. The varieties studied were Ben Davis, Delicious, Rhode Island Greening, Rome Beauty, Winesap and York Imperial. Changes in apples as they approach a ripe condition on the tree include (1) increase in size, (2) increase in the area and intensity of the red color and the change in the green or ground color from leaf green to yellow green, (3) a progressive softening of the fruit, and (4) a decrease in the apparent acidity in the fruit. Changes in fruit following picking are primarily a continuation of pre-picking changes. Softening and acidity changes have been studied. The rate of these changes varies with the temperature at which the fruit is held. Ben Davis softened as much in 2½ months at 32°F. as in 12 days at 70°F., Winesap and Rome Beauty as much in 3 to 4 months at 32°F. as in 12 days at 70°F., York Imperial as much in about 5 months at 32°F. as in 12 days at 70°F. Delicious and Rhode Island Greening were softer at the end of 12 days at 70°F. than they were at the end of their storage period, about 6 months at 32°F. There was no consistent difference in the rate of softening of fruit packed in different packages. Temperature seems to be the controlling factor in determining the rate of softening of fruit held under conditions of normal respiration. All varieties showed a constant decrease in acidity while in 32°F. storage. The rate of decrease was very nearly the same for all varieties. Acidity decreased relatively less rapidly during exposure to warm temperatures than did softening of the fruit. There is no distinctive variation in acidity of fruit due to the type of package used. If the air of the storage room was kept sufficiently moist (at least 85% relative humidity) very little loss in weight of fruit occurred regardless of type of package used. Coating the surface of the fruit with paraffin



or with oil caused a retardation in rate of softening and appearance of yellow ground color. Coating the fruit reduced the permeability of the skin. This resulted in higher  $\text{CO}_2$  concentration and lower  $\text{O}_2$  concentration in the gas of the intercellular spaces. Coating the fruit resulted in a reduced respiration rate. At  $32^\circ\text{F}$ . this reduction was due to  $\text{CO}_2$  accumulation. At  $64.5^\circ\text{F}$ . the  $\text{O}_2$  in the tissues of coated fruit was practically exhausted. At  $80^\circ\text{F}$ . marked anaerobic respiration occurred in coated apples. In normal, uncoated fruit, the respiratory ratio at all temperatures was approximately one. The rate of  $\text{CO}_2$  evolution was very close to the ratio of softening rates at different temperatures. Atmospheres containing different  $\text{CO}_2$  concentrations, with 20%  $\text{O}_2$ , markedly decreased the rate of softening. The decrease in rate was proportional to the  $\text{CO}_2$  concentration. An apparatus for determining the amounts of  $\text{CO}_2$  given off and of  $\text{O}_2$  absorbed by the fruit is described.—*H. C. Diehl*.

6165. ONKEN, ALBIN. **Kritisches und Experimentelles zur Frage nach der ernährungs-physiologischen Leistung des Milchsafte.** [Nutrition value of latex.] *Bot. Archiv* 3: 262-272. 1923.—The author concludes that the physiological significance of latex starch as a nutrient is slight.—*William Seifriz*.

6166. PRINGSHEIM, HANS, UND KARL O. MÜLLER. **Zur Physiologie der "Polyamylosen"** I. [Physiology of the "polyamyloses."] *Zeitschr. Physiol. Chem.* 118: 236-240. 1922.—Filaments of *Spirogyra dubia* kept in tap water in darkness until free of starch, were given organic nutrients to determine whether they could produce starch. The carbohydrates glucose, fructose, galactose, maltose, and cellobiose and the alcohol glycerol could be converted into starch; but none of the "polyamyloses" were so used, under the conditions, and with the kind of plant employed.—*Chas. A. Shull*.

6167. SABALITSCHKA, T., UND H. RIESENBERG. **Über die Ernährung von Pflanzen mit Aldehyden II. Polymerisation des Formaldehyds durch Phaseolus multiflorus und Pelargonium zu höheren Kohlenhydraten.** [The polymerisation of formaldehyde to higher carbohydrates by Phaseolus multiflorus and Pelargonium.] *Biochem. Zeitschr.* 144: 545-550. 1924.—The aerial portions of *Phaseolus multiflorus* and *Pelargonium* plants were bathed in gaseous formaldehyde. The dry weight increased and the sugar and starch content was higher than in the checks. Formaldehyde was polymerized in the dark to carbohydrate, showing that formaldehyde may be used by plants.—*H. D. Hooker, Jr.*

6168. SABALITSCHKA, T., UND H. RIESENBERG. **Über die Ernährung von Pflanzen mit Aldehyden. III. Stört noch vorhandener Formaldehyde die Bestimmung von Zucker und Stärke nach Sabalitschka in den mit Formaldehyde behandelten Pflanzen?** [Does the presence of formaldehyde interfere with sugar and starch determinations?] *Biochem. Zeitschr.* 144: 551-555. 1924.—The presence of formaldehyde was estimated colorimetrically using phloroglucinol. No formaldehyde was found in leaf extracts prepared in the same way as those used for sugar analysis. Samples of leaf powder such as those used for starch analysis contained about 0.1 mgm. of formaldehyde. This amount of formaldehyde is insufficient to account for the increases in starch previously reported.—*H. D. Hooker, Jr.*

6169. SANDO, C. E., AND J. U. LLOYD. **The isolation and identification of rutin from the flowers of elder (Sambucus canadensis L.).** *Jour. Biol. Chem.* 58: 737-745. 1924.—The yellow pigment from the flowers of *Sambucus canadensis* is rutin ( $\text{C}_{27}\text{H}_{30}\text{O}_{16}$ ).—*G. B. Rigg*.

6170. TOBLER, FR. **Vorkommen und Abbau von Flechtenstärke.** [Appearance and removal of starch in lichens.] *Ber. Deutsch. Bot. Ges.* 41: 406-409. 1923.—For this study the author used *Zanthoria parietina*. He found that starch accumulated greatly in the fall while it decreased greatly at the beginning of the year. The reaction toward I as well as the appearance differed in the 2 seasons. In spring the starch stained a reddish color instead of a deep blue as in the autumn. If he treated fresh autumn specimens with ptyalin the starch gradually dissolved and when tested with I gave a reddish color like that found in the lichen in the spring. The appearance of the remaining grains was like that of those in the lichen in the spring. The author suggests that the fungous part of the lichen dissolves the starch in the algal-part. This he believes makes clear the food relations between the algae and fungi.—*Hally Jolivette Sax*.

6171. TOTTINGHAM, W. E. Temperature effects in plant metabolism. Jour. Agric. Res. 25: 13-30. 4 pl., 2 fig. 1923.—Cultures of red clover (*Trifolium pratense*) on Miami silt loam were grown in greenhouses within two different temperature ranges, the soil moisture being kept approximately equal in various culture pots. As measured by atmometers, the aerial environment of plants grown at an average temperature of 15°C. provided over 40% more solar illumination, but less than 70% as much evaporation, as compared with an average temperature of 20.6°C. At approximately the same stage of development (after 12 weeks at the higher temperature and 14 weeks at the lower one) the dry tops of the plants contained 3.9% more sugars and easily hydrolyzable polysaccharides, but 2.1% less crude protein, at the lower temperature. Buckwheat (*Polygonum fagopyrum*) was grown to maturity in cultures on Miami silt loam within chambers devised for roughly controlling atmospheric temperature and humidity. The water plane of the soil was regulated to optimal values by weighing. With a temperature range from an average daily minimum of 16° to a maximum of 19°C., the solar radiation, reinforced by electric lamps, was less than 5% greater, while the evaporation was 93% of that which obtained at the higher range of 20.5 to 25°C. average temperatures. The total sugars and polysaccharides (determined by rather severe hydrolysis) were 4.4% and 5.2% more abundant in the dry leaves and stems respectively of plants grown at the lower temperature range. The dry seeds contained 5.8% more starch at the lower temperature range as compared with the higher one. Sand cultures of buckwheat grown in temperature ranges of 16.9-23.3° and 23.2-28.2°C., average minima and maxima, were subjected to 11% greater evaporation at the lower temperature range, but to practically equal illumination in the two cases. The dry stems of the plants contained 4.8% more polysaccharides (starch and hemicellulose) at the lower temperature range. These cultures produced seed but those at the higher temperatures did not. It is suggested that this difference in compositional response of the plants may be due to limitation of polysaccharide storage as a result of increased respiration at the higher temperatures.—*Author*.

6172. WICHMANN, H. J. Report on determination of pectin in fruit and fruit products. Jour. Assoc. Offic. Agric. Chem. 7: 107-112. 1923.—Pectin is very insoluble in 80-90% alcohol. If in quantities less than 10 mg. in 220 cc. of alcohol and if very pure it may be invisible. Electrolytes will cause it to flocculate and become amenable to quantitative determination. The Carré-Haynes method for calcium pectate yields accurate results only when care is used in washing the precipitate. Calcium pectate and the pectic acid of Wichmann and Chernoff do not agree in composition. There is some evidence that calcium pectate is a mixture.—*F. M. Schertz*.

#### METABOLISM (NITROGEN RELATIONS)

6173. CAMARGO, T. DE A. The presence of vernine (guanosine) in the green leaves and berries of the coffee tree (*Coffea arabica* L.) and its relation to the origin of caffeine in this plant. Jour. Biol. Chem. 58: 831-834. 1924.—In the green leaves and berries of *Coffea arabica* there exists a pentoside containing guanine. This is probably the guanosine discovered by other workers in several plants and in nucleic acid. The caffeine in the green leaves and berries of the coffee tree probably takes its origin from this pentoside. It is transformed by enzymes to guanine, then to xanthine and finally from xanthine to caffeine.—*G. B. Rigg*.

6174. HAMMARSTEN, E. Zur Kenntnis der biologischen Bedeutung der Nucleinsäureverbindungen. [The biological significance of nucleic acid compounds.] Biochem. Zeitschr. 144: 383-466. 21 fig. 1924.—This monograph shows that salts of nucleic acid have a much greater lability with respect to osmotic pressure, viscosity, etc., than neutral proteins, producing in the nucleus an effect analogous to that produced in muscle tissue by lactic acid formation. The methods are described by which free thymonucleic acid, its Na salt (Na<sub>4</sub>T) and the other proteins used in the investigation were prepared. The free acid formed a  $3 \times 10^{-3}$ N solution. Determination of the dissociation constants showed thymonucleic acid to be a strong polyphosphoric acid. The dissociation calculated from H-ion determinations corresponded well with that calculated from the conductivity, when the relative diffusion of the monovalent anion was made equal to 25. The degree of dissociation



of  $\text{Na}_4\text{T}$  could not be determined by conductivity measurements. The osmotic pressures of nucleic acid and its Na salt are smaller than would be expected from the undissociated molecules. It is concluded that the osmotic pressure of electrolytes composed of ions of widely unequal size may approach that of non-electrolytes under certain conditions, so that osmotic regulation may result when a large cation is exchanged for a small one in salts of nucleic acid. The Na salt of thymonucleic acid exhibited a strong Donnan effect at neutral reaction. The presence of this or similar salts in the nucleus is considered significant since small concentrations of neutral salts that would have no osmotic effect on the cytoplasmic proteins could have a profound effect on the osmotic pressure of the nucleus. The relative inner friction of  $\text{Na}_4\text{T}$  was high, the salt holding 400 times its volume of water in dilute solution. When the viscosity of the Na salt was lowered, a partly reversible gel formation occurred, apparently by a reversal of phases, the nucleic acid particles agglutinating and forming the disperse phase. The internal friction of  $\text{Na}_4\text{T}$  was reduced by cations in weak concentrations and by strong acids. The relative inner friction of protein-nucleates was increased by addition of NaCl. Ampholytic salts of thymonucleic acid were completely hydrolysed by dialysis, if the ampholyte was diffusible. Salts of thymonucleic acid and protein with an isoelectric point of pH 4.7 existed in equilibrium with the protein as precipitates up to the isoelectric point. In the presence of larger concentrations of the Na salt of thymonucleic acid, the salts were soluble in water at H-ion concentrations less than  $3\text{--}3.5 \times 10^{-3}$ . Neutral salts of thymonucleic acid and di-amino acids were hydrolysed by dialysis in the presence of very weak concentrations of NaCl, giving the Na salt of nucleic acid and the chloride of the amino acid. Such a double decomposition probably results without dialysis when nucleo-histone is in the presence of concentrated NaCl. Histone salts of thymonucleic acid are soluble in water when combined with at least 2 Na atoms.—*H. D. Hooker, Jr.*

6175. KENNEDY, CORNELIA. **The nutritive properties of wild rice.** *Jour. Agric. Res.* 27: 219–224. 2 fig. 1924.—This study of wild rice includes both a chemical and a biological analysis of the cereal. A comparison of the chemical composition of wild rice and cultivated polished and unpolished rice and the distribution of the inorganic elements is given. The biological analysis shows that the food value of wild rice is similar to other common cereal grains. Its proteins have rather low biological value but are of greater food value than those of polished rice. It resembles other cereals in containing inorganic material unsuitable for the promotion of growth and in being very deficient in vitamin A. Charts are given showing the rate of growth of albino rats when fed rations consisting of wild rice and wild rice with various additions.—*Author.*

6176. KIESEL, ALEXANDER. **Beitrag zur Kenntnis des Glutencaseins des Buchweizens.** [*Glutencasein of buckwheat.*] *Zeitschr. Physiol. Chem.* 118: 301–303. 1922.—The glutencasein of buckwheat has been analyzed and found to contain 0.84% histidine, about 7% arginine, and about 1.5% lysine.—*Chas. A. Shull.*

6177. KIESEL, ALEXANDER. **Zur Kenntnis der Hefeeiweisses.** [*Yeast proteins.*] *Zeitschr. Physiol. Chem.* 118: 304–306. 1922.—The analysis of yeast protein yielded humin N, 15.22%; ammonia N, 4.5%; histidine N, 5.22%; arginine N, 7.96%; and lysine N, 7.96%.—*Chas. A. Shull.*

6178. LÜERS, H., UND M. SIEGERT. **Zur Kenntnis der Proteine des Hafers.** [*The proteins of oats.*] *Biochem. Zeitschr.* 144: 467–476. 1924.—Three native proteins and 3 derived proteins were isolated from oat meal. The N content of these proteins was determined according to the Van Slyke procedure. The alcohol soluble protein gave the same analysis before and after hydrolysis. Like hordein and gliadin, it is high in ammonia N and in N of the basic filtrate, but low in lysine. The oat protein has double the cystine N content of gliadin and hordein and an intermediate histidine content. The alcohol-soluble protein obtained after previous treatment with water and salt solution had a different analysis. The globulin of oats extracted in the cold differed from the globulin of wheat and from edestin in having a lower arginine content and much more amino N in the basic filtrate. Avenalin, the globulin extracted with hot 10% salt solution, had a composition intermediate between the other oat globulin and edestin, being high in arginine and histidine N. The alkali soluble protein of oats resembled avenalin in several respects.—*H. D. Hooker, Jr.*

6179. ROE, J. R. The estimation of the hydrogen cyanide content of amygdalin by the aeration method. Jour. Biol. Chem. 58: 667-669. 1924.—A method has been devised for estimating the HCN in amygdalin by enzymatic hydrolysis and application of the aeration procedure. The method should prove a favorable means for quantitative investigations of cyanogenetic plants in general.—G. B. Rigg.

#### METABOLISM (ENZYMES, FERMENTATION)

6180. CANNON, PAUL R. A biologic study of aciduric bacteria. Jour. Infect. Diseases 34: 227-238. 1924.—Some physiological characteristics of 64 strains of *B. acidophilus* and 34 strains of *B. acidophil-aerogenes* were studied. These organisms acted as facultative anaerobes. They failed to develop in autolyzed yeast infusion broth in the absence of a fermentable carbohydrate. Most strains of *B. acidophilus* but less than half of the strains of *B. acidophil-aerogenes* clotted milk within 35 days at 37°C. The organisms developed best between pH 6.0 and 7.0. When grown together, *B. coli* failed to develop below pH 5.0 while *B. acidophilus* developed well. *B. coli* predominated under the more alkaline conditions.—R. L. Starkey.

6181. COURMONT, PAUL, ET A. ROCHAIX. Variations de la fermentation des "sucres" par les Bacilles dysentériques sous l'influence du "co-entraînement." [Variations in "sugar" fermentations produced by the dysentery Bacilli under the influence of related sugars.] Compt. Rend. Soc. Biol. 88: 786-788. 1923.—It was attempted to learn whether varieties of dysentery bacilli trained to ferment one kind of sugar would then ferment a related sugar. That this phenomenon occurs is established but the ability does not seem to be of long duration. In a certain number of cases, however, the fermentation power acquired in this manner can persist for several generations. [See also following entry.]—Oran Raber.

6182. COURMONT, PAUL, ET A. ROCHAIX. Variations in vitro de la fermentation des "sucres" par les Bacilles du groupe dysentérique. [Variations in vitro in "sugar" fermentations produced by bacilli of the dysentery group.] Compt. Rend. Soc. Biol. 88: 784-786. 1923.—By means of successive transfers on the same medium bacteria can be trained to ferment sugars which they at first did not ferment. The 4 types of the dysentery group behaved differently. The Flexner and Hiss type both acquired the ability to ferment sorbite and glycogen. The Hiss form also acquired the ability to act on saccharose which the Flexner type never acquired. [See also preceding entry.]—Oran Raber.

6183. D'AUNOY, RIGNEY. Studies on *Bacillus pestis*. Jour. Infect. Diseases 33: 391-415. 1923.—Maximum development occurred in veal infusion broth between pH 6.2 and 7.0. The limiting reactions were about pH 5.0 and 8.2. The H-ion concentration produced in media containing different concentrations of dextrose were different; lower H-ion concentrations were produced in the presence of less than 0.5% dextrose. In fermentation tests, 50 strains fermented dextrose, levulose, galactose and mannite; arabinose, maltose, glycerol and salicin were attacked by some; no strain attacked adonite, dextrin, dulcitol, inulin, lactose, melezitose, perseitol, quercitol, raffinose, rhamnose, saccharose, sorbite, trehalose, or zylitol.—R. L. Starkey.

6184. DOZIER, C. C., E. WAGNER, AND K. F. MEYER. Effect of glucose on biochemical activities, including growth and toxin production of *B. botulinus*. Studies on metabolism of anaerobic bacteria 2. Jour. Infect. Diseases 34: 85-102. 3 fig. 1924.—*B. botulinus* was grown in veal infusion-peptic digest both with and without 1.36% glucose. The course of growth, glucose disappearance, N transformations, gas formation, reaction, production of volatile acids and toxin formation were followed. The glucose disappeared rapidly after the first 24 hours. Final gas formation was much greater in the presence of glucose. Growth was more rapid and greater in the medium containing glucose. During the period of slow glucose utilization the protein underwent the most rapid decomposition. During the rapid disappearance of glucose there was a corresponding decrease in the  $\text{NH}_4\text{OH}$  content of the medium. Such disappearance of  $\text{NH}_4\text{OH}$  did not occur in the medium lacking the sugar. The presence of glucose did not alter the production of toxin.—R. L. Starkey.

6185. FELTON, LLOYD D. A new indicator for testing reducing power of bacteria. Jour. Infect. Diseases 34: 414-419. 1924.—The reducing power of 14 species comprising 48 strains



was tested by measuring the reduction of the green p-nitro malachite green to the red p-amino malachite green. All members of the colon-typhoid group tested, except *B. alkaligenes*, reduced the nitro compound. The cocci studied were not as strongly reducing, while *B. diphtheriae* failed to effect any reduction. Bacteria arrange themselves in 3 groups: those with great reducing power, those of great oxidizing power, and those which exhibit both oxidative and reductive potentials.—*R. L. Starkey.*

6186. FELTON, LLOYD D. Oxydase activity and isolation of pure cultures of bacteria. Jour. Infect. Diseases 34: 407-413. 1924.—Oxydase activity on solid media was investigated by determining the intensity of oxidation of the leucobase of p-amino malachite green to its corresponding dye form. Media most favorable to growth and having greatest surface exposure for oxidation gave the most intense color changes. In the presence of defibrinated horse blood, reactions between pH 7.0 and 7.6 and dextrose in amounts of 0.5 to 1.0%, permitted most intense oxydase activity and growth.—*R. L. Starkey.*

6187. HAGIHARA, J. Über den Einfluss von Kolloiden auf Fermente. III. [The influence of colloids on enzymes.] Biochem. Zeitschr. 144: 482-489. 1924.—Cholesterol had no effect on the enzymatic activity of pancreatin. Lecithin reduced the activity of pancreatin alkaline solutions, the effect increasing with the alkalinity.—*H. D. Hooker, Jr.*

6188. HOLMAN, W. L., AND F. L. GONZALES. A test for indol based on the oxalic reaction of Gnesda. Jour. Bact. 8: 577-583. 1923.

6189. HSÜ, TSON-HIA. Über die Adsorption des Trypsins durch Filtrierpapier. [The adsorption of trypsin by filter-paper.] Biochem. Zeitschr. 144: 303-307. 1924.—Trypsin was adsorbed by filter-paper from which it could not be removed by washing except in small amounts with dilute alkali. Dreverhoff filter-paper adsorbed less than Schleicher and Schüll.—*H. D. Hooker, Jr.*

6190. KIESEL, ALEXANDER. Über den fermentativen Abbau des Arginins in Pflanzen. II. [Enzymic decomposition of arginin in plants.] Zeitschr. Physiol. Chem. 118: 267-276. 1922.—Various plants, as *Secale cornutum* and *Vicia sativa*, are shown to contain arginase by proving the production of ornithine from arginine. Some  $\text{NH}_3$  is produced in the reaction.—*Chas. A. Shull.*

6191. KIESEL, ALEXANDER. Über die Wirkung der Arginase auf Agmatin und Tetramethylene-diguanidin. Ein Beitrag zur Kenntnis der Specifität der Fermente. [The effects of arginase upon agmatine and tetramethylenediguanidine.] Zeitschr. Physiol. Chem. 118: 284-300. 1922.—Arginase, which occurs in *Secale cornutum*, *Vicia sativa*, and such fungi as *Aspergillus niger* and *Agaricus campestris*, will not act upon agmatine. But the enzyme from *A. niger* does act upon tetramethylenediguanidine, and produces agmatine, which is not further acted upon. None of the other plants used could cause this reaction. The author considers some of the problems of enzyme specificity.—*Chas. A. Shull.*

6192. KIESEL, A., UND TROITZKI. [Beitrag zur Kenntnis der Verbreitung der Urease in Pflanzen. [The distribution of ureases in plants.] Zeitschr. Physiol. Chem. 118: 247-253. 1922.—The urease content of *Aspergillus niger*, and of the leaves, stems, fruits, roots, etc., of various seed plants was investigated. Drying, or autolysis, of the material reduces urease activity. Leaves are richer in urease than stems and roots. Fruits and seeds increase in urease during ripening and during germination, but as food reserves diminish urease decreases in the seedling.—*Chas. A. Shull.*

6193. KOSTYTSCHEW, S., UND P. ELIASBERG. Über Invertase von *Mucor racemosus*. [Invertase of *Mucor racemosus*.] Zeitschr. Physiol. Chem. 118: 233-235. 1922.—The authors find that only minus strains of this mucor contain invertase. The plus strain contains no invertase and cannot invert cane sugar. The older literature has shown *Mucor racemosus* to be the only mucor able to invert sucrose. The plus and minus strains also differ in other activities, so that one must take into consideration the strain used in any experimentation.—*Chas. A. Shull.*

6194. LÜERS, H., UND P. LORINSER. Über die Hitze- und Strahlungsinaktivierung der Malzamyase. [Inactivation of malt amylase by heat and radiation.] Biochem. Zeitschr. 144: 212-218. 2 fig. 1924.—In higher concentrations of buffer solutions the zone of maximum stability of malt amylase to inactivation by heat moved toward higher pH values. Gelatin, egg albumin and gum arabic had a protective action, particularly at higher pH values. The

protective action of maltose was considerable, the logarithm of the molar concentration being directly proportional to the coefficient of inactivation. Inactivation of amylase by ultra-violet light is less affected by H ions than inactivation by heat, there being fundamental differences between them.—*H. D. Hooker, Jr.*

6195. MICHAELIS, L., AND H. DAVIDSOHN. Verfahren zur Reinigung von Toxinen, Fermenten und anderen biologisch wirksamen organischen Kolloiden. [The purification of toxins, enzymes and other biologically active organic colloids.] *Biochem. Zeitschr.* 144: 294-297. 1924.—Organic colloids may be purified by flocculation at the optimum H-ion concentration—the isoelectric point.—*H. D. Hooker, Jr.*

6196. NEUBERG, C. Zur Frage der Konstitution des biochemisch gebildeten Oxy-oxo-propyl-benzols. [The constitution of biologically synthesized oxy-oxo-propyl benzol.] *Biochem. Zeitschr.* 144: 44-46. 1924.—When benzaldehyde was added to fermenting sugar solution, an acyloin-like compound with acetaldehyde was formed by carboligase activity. On treatment with phenyl magnesium bromide and subsequent warming with dilute  $H_2SO_4$ , methyl-phenyl-aceto-phenone was obtained. This would indicate that the original compound was acetyl-phenyl-carbinol,  $C_6H_5.CHOH.CO.CH_3$ , rather than benzoyl-methyl-carbinol,  $C_6H_5.CO.CHOH.CH_3$ . However, there are indications that one of these compounds may be transformed to its isomer through an intermediate di-enol.—*H. D. Hooker, Jr.*

6197. NOGUCHI, J. Über Sulfatase. IV. Über die enzymatische Spaltung der  $\beta$ -Naphthol-schwefelsäure. [Sulphatase. The enzymatic cleavage of  $\beta$ -naphtholsulphonic acid.] *Biochem. Zeitschr.* 144: 133-140. 1924.—Sulphatase acts on ether sulphonic acids such as  $\beta$ -naphtholsulphonic acid, 25% of which was decomposed to  $\beta$ -naphthol and  $H_2SO_4$ . The method is described by which the K salt of  $\beta$ -naphthol-sulphonic acid was prepared.—*H. D. Hooker, Jr.*

6198. ORIENT, J. Über die Wirkung der Amine auf die Gärung. II. [The action of amines on fermentation.] *Biochem. Zeitschr.* 144: 353-360. 1924.—Zymase activity was reduced by free amine bases, such as diethylamine, propylamine, ethylenediamine, etc. Fermentation was increased by salts of the amines such as the hydrochlorides.—*H. D. Hooker, Jr.*

6199. ORIENT, J. Über die Wirkung der Oxymethylantrachinon—enthaltenden Drogen auf die Gärung. [The action of drugs containing oxymethylantraquinone on fermentation.] —*Biochem. Zeitschr.* 144: 361-365. 1924.—Fermentation was activated by drugs such as rhiz. rhei chinense, rhiz. rhei schensi mundata which contain trioxymethylantraquinone, and cortex frangulae which contains emodin. Related drugs that contained no emodin had little effect. Fermentation was retarded by small amounts of aloe which contains oxymethylantraquinone. The action of *Jalappa tubera*, *Colocynthis fructus*, *Cassia fistula* and *Cascara sagrada* was less pronounced.—*H. D. Hooker, Jr.*

6200. PINCUSSEN, L. Fermente und Licht. V. Diastase. IV. [Enzymes and light. Diastase.] *Biochem. Zeitschr.* 144: 372-378. 1924.—The effect of NaCl on the inactivation of malt diastase exposed to sunlight and to light from a quartz lamp was measured. NaCl was found to reduce the activity of the diastase and to reduce its sensitivity to light, presumably by increasing the size of the particles in the same way as effected by the light treatment. The protective action of NaCl was least at pH 6.64. Small quantities of other salts showed greater protective action than larger amounts.—*H. D. Hooker, Jr.*

6201. RAYBAUD, L. Sur la flore microscopique de l'acide citrique à diverses concentrations. [The microscopic flora of citric acid at various concentrations.] *Compt. Rend. Soc. Biol.* 88: 803-805. 1923.—The number of forms present decreases as the concentration of citric acid rises. Among the plants found and described are a planococcus and a bacillus (at 1-16% citric acid) and an *Aspergillus* (56%). *Sterigmatocystis nigra* and *Penicillium glaucum* are found up to 52%. At 16 and 32% a penicillium was found which seems to be *P. divergens*. At 64% a mycelium was found but in the absence of reproductive organs no determination could be made. No *Citromyces* was found.—*Oran Raber.*

6202. RENZO, F. DI. Fermente und Licht. IV. Diastase. III. [Enzymes and light. Diastase.] *Biochem. Zeitschr.* 144: 366-371. 1924.—The amylolytic activity of diastase that had been exposed to light from a mercury quartz lamp for various intervals was measured and the reaction constant calculated at various H-ion concentrations. With increased exposure the reaction constant decreased. The inactivation constant was also calculated



from digestion experiments with various concentrations of starch at different H-ion concentrations. It is concluded that enzyme inactivation by light from a quartz lamp follows the course of a monomolecular reaction. The maximum decrease in the reaction constants occurred at pH 6.26.—*H. D. Hooker, Jr.*

6203. RENZO, F. DI. Zur Kenntnis der Auxoureasen. [Auxoureases.] *Biochem. Zeitschr.* 144: 298-302. 1924.—Jack bean urease was activated by previous warming for 10 minutes, the optimum temperature lying between 60° and 70°C. Urease treated with dilute sublimate and heated for 10 minutes to 80°C. could not be reactivated by KCN. The activation of urease by the auxo bodies, KCN and glycine, was parallel to but independent of the temperature effect.—*H. D. Hooker, Jr.*

6204. REVOLTELLA, G. Weiteres über die Herstellung des Ureasetrockenfermentes und über die Methodik der Harnstoffbestimmung in normalen und pathologischen Harnen. [The preparation of dried urease and the determination of urea in normal and pathologic urines.] *Biochem. Zeitschr.* 144: 229-257. 1 fig. 1924.—The importance of using soybeans of good grade for the preparation of urease is emphasized. The ground beans should be soaked for 5 to 10 hours in water, filtered by suction, and the residue soaked again and filtered. For precipitation, the united filtrates should be added to 0.4 volume of 96% alcohol.—*H. D. Hooker, Jr.*

6205. RONA, P., UND E.[ERNST] BLOCH. Beiträge zum Studium der Giftwirkung: Über die Wirkung des Chinins auf Invertase. [The action of quinine on invertase.] *Biochem. Zeitschr.* 118: 185-212. 16 fig. 1921.—The toxic action of quininehydrochloride on invertase depends upon the H-ion concentration of the alkaloid-ferment mixture. As the H-ion concentration decreases the toxic action increases corresponding to the dissociation of the quinine salt, the toxic action of which is due to the free base. H-ion concentration plays a similar role in the poisoning of *Paramecia* by quinine. The logarithm of the quinine concentration varies directly with the logarithm of the toxicity (toxicity coefficient). The toxicity is completely reversible and is independent of temperature. It is also independent of ferment concentration and of the sucrose used. The quinine derivatives, optochin, eucupin, and vuzin behave towards invertase as does quinine; their toxicity depends upon the H-ion concentration, shows the same concentration-toxicity curve, is completely reversible, and is not affected by the substrate. The toxicity of vuzin is considerably more than that of the others. Quinidine also shows a greater toxic action than quinine.—*Oran Raber.*

6206. RUDOLFS, W., AND ANDRE HELBRONNER. Oxidation of zinc by microorganisms. *Soil Sci.* 14: 459-464. 1 fig. 1922.—Microorganisms are able to oxidize zinc sulfide to zinc sulfate. The growth of these organisms is not inhibited by the resulting soluble zinc. The addition of elemental sulfur to impure cultures increases the rate of solubility of zinc blende. Sulfur-oxidizing organisms produce sufficient sulfuric acid to render zinc carbonate and zinc silicate soluble. It is suggested that a biological method of utilizing low grade zinc sulfide ores might be devised.—*W. J. Robbins.*

6207. SCHOENHOLZ, J. R., J. R. ESTEY, AND K. F. MEYER. Toxin production and signs of spoilage in commercially canned vegetables and fruits inoculated with detoxified spores of *B. botulinus*. XII. *Jour. Infect. Diseases* 33: 289-327. 1923.—Of 77 outbreaks of botulism, 49 occurred from home preserved foods and 28 from commercially packed products. String beans and corn seem responsible for most of the outbreaks from home packed products. In the commercially canned products spinach and olives seem most frequently contaminated with the organism. About  $\frac{1}{2}$  of the cans of asparagus, beets and spinach inoculated with spores of *B. botulinus* developed "swells." Contents of most of the "swells" and those of some of the flat cans were toxic. The amount of spoilage was not always an indication of the amount of toxin present. Toxin may be present without any apparent abnormality in the product. Toxin production in canned corn, peas, sweet potatoes, and salmon was pronounced and usually accompanied by gas formation and offensive odors. Toxin production by the organism inoculated in ripe olives was irregular and no potent toxins were demonstrated. Canned green and red peppers inoculated with the organism rarely spoiled and were only weakly toxic. Growth of *B. botulinus* is irregular in canned string beans. Toxins are frequently found in contents normal in odor and appearance. Growth was also irregular in evaporated milk. Canned tomatoes, sauerkraut, apricots, cherries, peaches, pears, plums, raspberries and straw-

berries inoculated with *B. botulinus* became only weakly toxic even after 5½ months incubation, and spoilage was seldom detected. The more acid canned products are less susceptible to development of *B. botulinus* and subsequent toxin production. The organism frequently remained dormant in canned goods without the production of toxin. It has been frequently noted that: (1) The contents of nontoxic tins may become toxic, (2) the toxicity of the liquor increases on prolonged incubation, and (3) prolonged incubation increases the number of swells.—*R. L. Starkey*.

6208. SUMNER, J. B., V. A. GRAHAM, AND C. Y. NOBACK. **Urease and the jack bean proteins.** Jour. Biol. Chem. 59: Proc. XX. 1924.—Urease solutions free from both carbohydrate and protein have been prepared from the jack bean.—*G. B. Rigg*.

6209. TAKAHASHI, T. **Über das Vorkommen von Inulase in der Takadiastase.** [The presence of inulase in Taka diastase.] Biochem. Zeitschr. 144: 199–202. 1924.—Inulin was converted by Taka diastase to d-fructose, from which glucosazone was prepared. Taka diastase therefore contains inulase.—*H. D. Hooker, Jr.*

6210. VALDIGUIE, A. **Les sels de cuivre peuvent agir à la fois comme oxydases et comme peroxydases.** [Copper salts can act both as oxidases and as peroxidases.] Compt. Rend. Soc. Biol. 88: 1091–1092. 1923.

6211. WAGNER, E., C. C. DOZIER, AND K. F. MEYER. **Comparative study of growth and biochemical activities of *B. botulinus*, *B. sporogenes* and *B. tetani*, with notes on chemical behavior of *B. botulinus* type C. Studies on metabolism of anaerobic bacteria 1.** Jour. Infect. Diseases 34: 63–84. 3 fig. 1924.—All 3 organisms made rapid development in a peptic digest-beef heart medium and plate counts indicated that the numbers remained at a high level. Most of the N in the medium was rapidly brought into solution and practically all of the protein had been broken down into soluble N by the 6th day. *B. botulinus* and *B. sporogenes* formed  $\text{NH}_4\text{OH}$  more rapidly than *B. tetani*. Amino acid formation was in similar order. Determinations were also made for volatile acid reaction, gas production, disappearance of creatinin and toxin formation by the organisms. It is believed that determinations for non-protein N fractions of the cultures were the most significant for indicating bacterial proteolysis.—*R. L. Starkey*.

6212. WILLSTÄTTER, RICHARD, UND GERTRUD OPPENHEIMER. **Über Lactasegehalt und Gärvermögen von Milchzuckerhefen.** [Lactase content and fermentation capacity of lactose fermenting yeasts.] Zeitschr. Physiol. Chem. 118: 168–188. 3 fig. 1922.—The authors have attempted to determine whether, like maltose-fermenting yeasts, the lactose fermenters attack the disaccharide sugar without previous inversion. The power to ferment lactose varies widely among yeasts strains, or even within a given strain; lactose may be fermented in some cases more rapidly than an equivalent dextrose-galactose mixture, or even more rapidly than the disaccharide hydrolyses. In such cases they have found that if the fermentation of the lactose is suddenly interrupted, there are no monosaccharides present in the fermenting solution. This situation differs markedly from sucrose fermentation, in which hydrolysis is very rapid, and fermentation follows inversion. The authors conclude that the enzyme is a lactose-zyamase, and ferments the lactose without previous inversion.—*C. A. Skull*.

#### ORGANISM AS A WHOLE

6213. BOSSAN, E., ET H. ROSET. **Culture du Bacille tuberculeux en milieu liquide aéré.** [Culture of the tuberculosis bacillus in an aerated liquid medium.] Compt. Rend. Soc. Biol. 88: 1086–1088. 1 fig. 1923.

6214. FROUIN, A., ET MAYLIS GUILLAUMIE. **Influence de la concentration du glucose sur le développement et le rendement en poids du Bacille tuberculeux.** [Influence of concentration of glucose on growth as measured by dry weight of *Bacillus tuberculosis*.] Compt. Rend. Soc. Biol. 88: 1095–1096. 1923.—As the sugar increases from 0.5% to 4.0% in concentration in the medium, the dry weight increases from 0.194 gm. to 0.452 gm. The alkalinity also increases in every case.—*Oran Raber*.

6215. GAIDUKOV, N. **Zur Frage nach der komplementären chromatischen Adaptation.** [Complementary chromatic adaptation.] Ber. Deutsch. Bot. Ges. 41: 356–361. 1923.—The author gives a critical discussion of the work that has been done on the question of comple-



mentary color adaptation which is known as Gaidukov's phenomena. He points out that we have no proof that the color materials taken out of the cells in solution are identical with those in the living cells.—*Hally Jolivet Saz.*

6216. GARNER, W. W., C. W. BACON, AND H. A. ALLARD. Photoperiodism in relation to hydrogen-ion concentration of the cell sap and the carbohydrate content of the plant. *Jour. Agric. Res.* 27: 119-156. 2 pl., 16 fig. 1924.—This paper deals with H-ion concentration of the cell sap, carbohydrate content of the plant sap and tissues and water relations of the plant as affected by the length of the daily light period. Observations are reported on *Cosmos bipinnatus* Cav., *Soja max* (L) Piper, *Nicotiana tabacum* L, *Tithonia rotundifolia* (Mill) Blake, *Raphanus sativus* L, *Rudbeckia bicolor* L, and *Helianthus annuus* L. Growth and definite form of expression as controlled by the duration of the daily illumination period are associated with characteristic acidity relations in the cell sap as measured by H ion concentration. In short-day plants, indeterminate elongation of the vegetative stem, which is a characteristic response to a relatively long daily illumination period, is accompanied by progressive increase in acidity, especially in the region of the growing point, until the upper portions of the plant become more acid than the lower portions. Exposure of short-day plants to a short daily period of illumination checks increase in stature and initiates flowering, and, under these conditions, a brief transitory period of decreased acidity is followed by a moderate increase to the level at which the flower bud appears. The upper portions of the plant are less acid than the lower portions. Abrupt transfer from a long day to a short day causes a sharp decline in acidity in the growing point which usually occurs within 3 to 5 days. This drop in acidity, believed to indicate transition from the vegetative to the flowering condition, is quickly followed by a rise to approximately the original level. In long-day plants, exposure to a short day tends to inhibit stem elongation and the acidity remains at a low level. Exposure to a long day favors elongation of the axis and flowering, and these activities are associated with a general increase in acidity. In some long day plants the upper portion of the stem is less acid than the lower portion until after the blossom has unfolded but in other long-day plants the reverse is true. The acidity gradient in long-day plants exposed to a long day resembles that of short-day plants exposed to a short day. In both short-day and long-day plants the young flower bud is relatively low in acidity but the acidity increases with growth, reaching a maximum in the unfolded blossom. The developing seed shows progressive decrease in acidity during active growth. In preliminary studies, transfer of cosmos from a long to a short day resulted in increase in reducing sugar within 48 hours, followed two days later by an increase in polysaccharid sugar and apparently a decrease in water content. After flower buds had appeared, reducing sugar and water content of the tissues again increased. In summer radish, elongation of the axis under a long-day exposure was accompanied by increase in reducing sugar in the tissues.—*W. W. Garner.*

6217. GATÉ, J., ET G. PAPACOSTAS. Recherches expérimentales sur les antagonismes microbiens. Action du Bacille de Löffler sur le Pneumobacille. [Action of Löffler's Bacillus on the Pneumobacillus.] *Compt. Rend. Soc. Biol.* 88: 797-798. 1923.—There is a one-sided antagonism between Löffler's bacillus and the pneumobacillus of Friedlander; the latter hinders the former while the diphtheria bacillus has no effect on the pneumobacillus. The pneumobacillus of a non-virulent strain does not recover its virulence even in an animal much injured by diphtheria toxin.—*Oran Raber.*

6218. GATÉ, J., ET G. PAPACOSTAS. Recherches expérimentales sur les antagonismes microbiens. Existe-t-il un antagonisme entre le Bacille de Löffler et le Staphylocoque? [Is there an antagonism between Löffler's Bacillus and Staphylococcus?] *Compt. Rend. Soc. Biol.* 88: 795-796. 1923.—Staphylococcus either by itself or by its secretion products does not seem to have any effect on the virulence of the diphtheria bacillus.—*Oran Raber.*

6219. HADLEY, PHILIP. Transmissible lysis of *B. pyocyaneus*. *Jour. Infect. Diseases* 34: 260-304. 3 pl. 1924.—Cultures of the organism on agar slants became characteristically pitted and eroded at the margins. Growth in infusion broth became viscous and ropy. These characteristics suggested the occurrence of lysis by a bacteriophage factor. The affected colonies were active producers of blue-green pigment, while the unaffected colonies produced only yellow-green or practically no pigment. Unaffected colonies always gave rise to homogeneous colonies on further plating, but corroded colonies gave rise to both unaffected

and corroded colonies. The cells of the corroded portions of the colonies underwent disintegration; large aggregates of needle-like crystals were formed in these areas. Commonly the colonies were first partially destroyed by the large lytic areas and then completely destroyed by mass lysis. Corroded colonies did not become corroded when touched with material from corroded colonies. The lytic strain became nonlytic after 30 to 40 transfers. Filtrates of cultures of the organism inhibited growth of only the most sensitive strains. Frequently secondary growth appeared over the area of lysis. Evidence of lysis appeared following intense bacterial activity. It is believed that lysis is not caused by anything foreign to the cells, but is a normal part of the cell organization which is stimulated to intensified action; that is, the bacteria are self destructive.—*R. L. Starkey.*

6220. MCKINLEY, EARL B. The relation of digestive enzymes and ferments to the phenomenon of d'Herelle. *Jour. Bact.* 8: 543-550. 1923.—The data presented would tend to substantiate the claim that the lytic principle in the d'Herelle phenomenon is neither an enzyme nor a vitamin.—*C. E. Skinner.*

6221. SPEHL, PAUL. De l'influence du nombre de Bacilles de Koch sur le résultat des épreuves d'agglutination. [Influence of the number of Koch's Bacilli on the result of agglutination tests.] *Compt. Rend. Soc. Biol.* 88: 987-989. 1923.

6222. SPEHL, PAUL. Essai de systématisation pour la lecture des agglutinations du Bacille de Koch en culture homogène. [An attempt to systematize the reading of agglutinations of Koch's Bacillus in a homogeneous culture.] *Compt. Rend. Soc. Biol.* 88: 985-987. 1923.

6223. WEISS, CHARLES, AND DOROTHY WILKES-WEISS. Study of cultural requirements of *Spirochaeta pallida*. *Jour. Infect. Diseases* 34: 212-226. 1924.—*Spirochaeta pallid* developed at reactions between pH 6.8 and 7.9, best growth appearing at the more alkaline reactions. The incorporation of reducing substances such as asbestos, charcoal, filter paper, etc., did not aid growth. In the presence of platinized asbestos, however, growth was particularly good. Various yeast media and a medium containing neutralized orange juice did not support growth, although the organism developed well in media containing sterile raw potato. Media prepared from egg, blood, horse serum, etc., supported growth of the organism.—*R. L. Starkey.*

6224. WEISS, EMIL, AND LLOYD ARNOLD. A study of antigenic properties of bacteriophage. *Jour. Infect. Diseases* 34: 317-327. 1924.—A typhoid bacteriophage increased the opsonic index proportionally with its potency. Antibacteriophage serums were specific in inhibiting lysis of the bacteriophage used.—*R. L. Starkey.*

## GROWTH, DEVELOPMENT, REPRODUCTION

6225. BACHMANN, FREDA M. Growth of *Clostridium botulinum* in fermented vegetables. *Jour. Infect. Diseases* 34: 129-131. 1924.—*Clostridium botulinum* developed and produced potent toxin in fermented green beans but failed to develop in fermented cabbage.—*R. L. Starkey.*

6226. BAUCH, ROBERT VON. Kopulations Bedingungen und sekundäre Geschlechtsmerkmale bei *Ustilago violacea*. [Fusion and secondary species characters in *Ustilago violacea*.] *Biol. Centralbl.* 42: 9-38. 1922.—Bauch finds that the fusion of the sporidia of *Ustilago violacea* is primarily dependent upon the O<sub>2</sub> content of the medium, or the possibility of an intensive gas exchange with the air. The fusion is further dependent upon the alkalinity of the medium. Strong alkalinity or very weak acidity inhibits it. Carbohydrates and albuminous substances do not necessarily accelerate the fusion; high concentrations of carbohydrates or albuminous matter inhibit because of their osmotic activity. Sporidia fusion is independent of light.—The physiological action of two apparent sexes of sporidia has proved to be so constant throughout a large amount of material as to suggest secondary sex characters of a physiological nature.—*Ernest Reed.*

6227. BRAADFLADT, LOUIS H. The effect of kaolin on the intestinal flora in normal and pathologic conditions. *Jour. Infect. Diseases* 33: 434-456. 1 pl. 1923.—Kaolin did not affect growth of bacteria in either solid or liquid media although the number of cells were initially reduced when kaolin was added to a liquid medium. Kaolin is not apparently bactericidal. When added in sufficient amounts to toxic filtrates of several bacteria, kaolin combined with the toxins and rendered them harmless. Ingestion of kaolin by rats, dogs, and



men changed the intestinal flora from proteolytic to aciduric. The change was more satisfactory and less injurious than creating the same change by ingesting lactose. Very beneficial results were obtained by feeding kaolin to patients suffering with asiatic cholera, dysentery, chronic ulcerative colitis, and acute and chronic enteritis.—*R. L. Starkey.*

6228. DAMBOVICEANU, A., ET A. IOSIF. *L'influence de la concentration en ions H sur le développement du Bacille diphtérique.* [Influence of the H-ion concentration on the development of the diphtheria bacillus.] *Compt. Rend. Soc. Biol.* 88: 1343-1347. 4 fig. 1923.—The minimum pH for development is 5.5, the maximum 8.5, and the optimum 7.3-8.3.—*Oran Raber.*

6229. FULMER, ELLIS I., AND MICHAEL GRIMES. *The growth of yeasts on synthetic agar media.* *Jour. Bact.* 8: 585-588. 1923.—*Saccharomyces cerevisiae*, *Torula spherica*, and *Mycoderma* sp. grew well and produced typical colonies on synthetic agar media in which sucrose was the source of energy and  $\text{NH}_4\text{Cl}$  the source of N. Bacteria grew poorly on these media.—*C. E. Skinner.*

6230. HABERLANDT, G. *Über Zellteilungshormone und ihre Beziehungen zur Wundheilung, Befruchtung, Parthenogenesis und Adventive-embryony.* [Cell division hormones and their relation to woundhealing, fertilization, parthenogenesis, and adventive embryony.] *Biol. Centralbl.* 42: 145-172. 9 fig. 1922.—Mechanically isolated cells of palisade and spongy parenchyma with trichomes and stomatal guard cells when cultivated in various culture media may remain alive for weeks and exhibit various growth phenomena which remain in abeyance in normal tissue relations, but never show cell division. Thin strips of tissue from the medulla or cortex of a potato tuber likewise show no cell divisions except where the slip contains a fragment of vascular bundle and especially leptome elements, in which case cell divisions occur. If, however, a similar slip of potato tuber having no leptome element be applied to a slip having fragments of leptome (the applied faces being moistened) cell division is incited in the non leptome-bearing slip. Similar results were obtained by using stem fragments of various species. In short, wound cell formation occurs only when a cell division stimulus or cell division inducing hormone is furnished by vascular bundle elements. Mechanical bruising or tearing of tissues appears to set up decomposition processes which liberate a wound hormone capable of inducing cell divisions. If a section of kohlrabi tuber be thoroughly washed for 10-20 minutes with a brisk stream of water the hormone seems to be removed and only sparse cell division or none occurs, while in unwashed sections cell division goes vigorously forward. If, however, fine scrapings of kohlrabi be applied to the washed sector, cell division is incited. This is confirmed by using young but full grown leaves of certain *Crassulaceae* if portions are taken at the tip where the cells are compact (in older portions the hormone is not readily washed from the intercellular spaces.) The hormone seems to be produced in killed or wounded tissues by autolytic processes, since when cooked scrapings of tissue are applied to the washed sector only sparse cell division or none occurs.—Experiments with single cells or cell groups—trichomes, epidermal cells, guard cells—showed that even full grown cells could be incited to cell division by mechanical injury, though, because of a tendency to dry out quickly, these injured cells need to be connected with adjacent intact tissues.—Traumatic parthenogenesis and adventive embryony (from nucellar tissue) may be induced by wounding (by pinching or needle pricks on the ovule, or castration of young flowers) in, e.g., *Oenothera Lamarckiana*. The inciting agent here is a wound hormone. The author suggests that in natural, habitual, adventive embryony a necrohormone or decomposition product is liberated due not to any mechanical injury but to death of cells from some unknown internal cause.—Similarly, the author believes and produces evidence to show that in natural parthenogenesis the egg is stimulated to develop—regardless of whether it be haploid or diploid—by necrohormones. Cases of degenerating tapetum and synergids are figured, showing conditions which might and probably do offer the conditions of breaking down which would liberate the necrohormone. Wound endosperm is shown to be thus formed (e.g., in *Hieracium flagellare*) as also endosperm embryony.—With regard to the development of eggs requiring fertilization (amphimixis) the author believes that the sperm *per se* is not the agent nor the source of any developmental stimulus, but that the conveyance of the sperm to the egg is attended by mechanical disturbance and break down of plasmic stuff whereby necrohormones are released. These mechanical effects are obvious, e.g., in *Cycas* and *Zamia* and in certain animals (the

"penetrationsbahn" Korscheldt und Heider p. 643) e.g. in *Allobophora* and *Branchippus*. Finally with regard to vascular plants the author distinguishes 3 types of hormones which stimulate cell division: 1, the hormones of the embryo and the meristem, 2, of leptome, and 3, wound and neurohormones.—William L. Bray.

6231. KILLIAN, CHARLES. *Cultures d'Hépatiques*. [Liverwort cultures.] Compt. Rend. Soc. Biol. 88: 746-748. 10 fig. 1923.—Using pure cultures of *Calypogeia ericetorum*, *Scapania dentata*, and *Lophocolea bidentata*, it was found that both nitrogenous and glucose compounds retarded growth when in higher concentration than 5 parts in 10,000. The so-called saprophytic species behave in this respect like the aquatic forms. Hence, liverworts will not tolerate as high doses of organic compounds as had been previously supposed. *Novellia curvisolia* produced archegones in pure culture. This is the first time reproductive organs have been produced by liverworts in pure culture.—Oran Raber.

6232. POPOFF, METHODI. *Über die Stimulierung der Zellfunctionen*. [Stimulating functional activity in cells.] Biol. Centrbl. 42: 395-398. 1922. (Preliminary Report).—Reagents used to induce artificial parthenogenesis are equally applicable in stimulating somatic cell activity.—Injections (1916) of such reagents as  $MgCl_2$ ,  $MgCl_2$  plus  $NaCl$ ,  $MnCl_2$ , or ether into resting plants (*Syringavulgaris*) caused rapid growth and unfolding of leaf and flower buds. Renewed greenhouse experiments on *Syringa* and *Aesculus* with proper controls in winter months (1920-1922), using various reagents which induce parthenogenesis, resulted uniformly in accelerated cell division and growth. Injections of  $MgCl_2$ ,  $BaO$  plus  $MnO_2$  and ether into corms of *Cyclamen* resulted in a more luxuriant growth and richer inflorescence than in the controls. Seeds of various plants injected with numerous reagents employed in artificial parthenogenesis resulted in every case in stronger and larger plants than those produced from corresponding dry seeds or water treated seeds.—*Paramecia* of the same strain grown in solutions of reagents which induce artificial parthenogenesis—notably  $MgCl_2$ —showed not only a greatly accelerated rate of division (controls 242 in 7 days, in  $MgCl_2$  solutions 2027 in the same period), but increase in individual size (in normal culture  $130 \times 54\mu$ , in stimulated culture  $154\mu \times 58\mu$ ). This induced larger size was maintained in later generations in normal cultures.—Willstätter's work on chlorophyll, in which the importance of  $Mg$  was shown, is cited as of significance in connection with the author's results. The complete researches are to be published in *Archiv für Zellforschung*.—William L. Bray.

6233. RENICH, MARY E. *Growth as related to specific gravity and size of seed*. Trans. Illinois Acad. Sci. 14: 109-139. 1921.—Common garden bean seed were separated into 6 groups of different densities by use of  $NaNO_3$  of 1.32, 1.27, 1.22, 1.17 and 1.12 specific gravity. The seed of each of the densities were then grouped according to length into small, medium and large. Seedlings of each group were grown in darkness at constant temperatures. Daily increments and total dry weights were recorded. The greatest height and diameter of shoot, greatest dry weight and greatest rate of growth were recorded for the three groups having the highest specific gravity. In these groups the total growth varies directly with the length of seed.—W. G. McGinnies.

6234. ROBERTSON, R. C. *Food accessory factors (vitamins) in bacterial growth*. VIII. *Relation to substances formed by B. coli to the growth of yeast*. Jour. Infect. Diseases 34: 395-399. 1924.—*B. coli* grew but yeast failed to growth with continuous transfer upon a synthetic medium. The yeast grew well when extracts of autolyzed yeast, grated carrot, or growth of *B. coli* was incorporated with the synthetic medium. The results are interpreted to indicate that *B. coli* is not dependent upon vitamins and produces substances necessary to the growth of the yeast which is dependent upon such accessory food substances.—R. L. Starkey.

6235. SARTORY, A., ET R. SARTORY. *Action combinée du sulfate de thorium et de l'agitation sur la croissance du Phycomyces splendens Bainier*. [The combined action of thorium sulphate and agitation on the growth of *P. splendens* Bainier.] Compt. Rend. Soc. Biol. 88: 743-746. 1923.—Thorium sulphate has a marked antiseptic action on the growth of *Phycomyces splendens* at a concentration of 1 part in 200. Between 1 part in 5,000 and 1 in 10,000 the growth is favored. If the culture is agitated from the time of sowing on, there is a combination of chemical and mechanical actions. The structure and development of the fungus are much altered. The oidial type of structure appears accompanied by swellings, constrictions of the filament, formation of crosswalls, and a tendency to form yeast like cells.—Oran Raber.



6236. SÖDING, H. Werden von der Spitze der Haferkoleoptile Wuchshormone gebildet? [Are growth hormones formed in the tips of the coleoptile of oats?] Ber. Deutsch. Bot. Ges. 41: 396-400. 1923.—The author decapitated the coleoptiles of seedlings of *Avena sativa*. In part of these he replaced the tips. Where the tips were replaced, the growth after five hours was greater than where the tips were left off. Placing wax or pieces of potato tuber on the decapitated plants had no effect. The author offers 2 possible explanations: (1) That growth hormones are formed in the tip; (2) that the growth inhibiting effect of decapitation is decreased by the tip.—*Hally Joliette Sax.*

6237. ZOTTA, G. L'action favorisante de la "catalase" du foie de Veau sur le développement du *Leptomonas pyrrocoris* en culture. [The favorable effect of "catalase" from liver on the development of *Leptomonas pyrrocoris* in cultures.] Compt. Rend. Soc. Biol. 88: 1350-1352. 1923.

### TEMPERATURE RELATIONS

6238. ALLEN, PAUL W. The attenuation of bacteria due to temperature shock. Jour. Bact. 8: 555-566. 1923.—For 15 organisms isolated from milk, including *Bacterium coli*, *Bacterium lactis-acidi*, *Bacillus subtilis*, and *Micrococcus* sp., pasteurization not only reduced the number of living organisms but also appeared to attenuate the surviving cells with the exception of *B. subtilis* spores which were stimulated by heat.—*C. E. Skinner.*

6239. FAWCETT, H. S. Influence of time and temperature on the rate of growth of certain fungi. [Abstract.] Phytopathology 14: 119-120. 1924.

### RADIANT ENERGY RELATIONS

6240. MCGUIRE, L. P. Researches on the vegetation of Natal, Series 1, Section III. The measurement of light intensity in South Africa, with special reference to plant habitats. Mem. Bot. Soc. South Africa 5: 33-44. 1923.—A method of measuring light intensities by liberation of I from the KI in the presence of  $H_2SO_4$  and titrating with sodium thiosulphate, has been applied to South African conditions. Comparisons are given with results obtained in other countries by the same method.—The effect of altitude, slope, and exposure are illustrated. The method has also been applied to the analysis of certain plant communities and to plant succession in Natal, and has been found useful as a part of the ordinary laboratory practice in connection with physiological experiments.—*L. J. Goldblatt.*

6241. ZWAARDEMAKER, H. La corpusculo-équivalence des dosages radio-biologiques. Une loi empirique. [The corpuscular equivalence of radio-active biological doses. An empirical law.] Compt. Rend. Soc. Biol. 88: 726-729. 1 fig. 1923.—The logarithm of the number of particles emitted per gm. per second varies directly with the logarithm of the dosage as measured in gm. per l. Theoretical considerations are included.—*Oran Raber.*

### TOXIC AGENTS

6242. REBELLO, SILVIO. Sur les propriétés oligodynamiques des composés mercuriels difficilement solubles. [The oligodynamic properties of difficultly soluble mercury compounds.] Compt. Rend. Soc. Biol. 88: 1333-1335. 1 fig. 1923.—The toxic action as seen with cultures of *Bacillus typhosus* is described.—*Oran Raber.*

6243. WHERRY, W. B. Action of ammonia on pneumococcus and mechanism of capsule staining. Jour. Infect. Diseases 34: 124-128. 2 fig. 1924.— $NH_4OH$  in small amounts inhibited development of pneumococcus. The effect was caused by the OH ion and not by the cation. In the presence of about N/40 acid in serum or ascites fluid, capsules were clearly observed about the pneumococci.—*R. L. Starkey.*

### ELECTRICITY

6244. CLUZET, ROCHAIX, ET TH. KOFMAN. Sur le galvanotropisme des microbes. [The galvanotropism of microorganisms.] Compt. Rend. Soc. Biol. 88: 779-780. 1923.—The dysentery bacteria and the paratyphoid bacillus B are electro-positive. Among the electro-negative forms are *Bacillus enteritidis* Gärtner, *Vibrio Metchnikowi*, *Bacillus lactis aerogenes*,

*B. subtilis*, *B. mesentericus vulgatus* and *niger*, *B. syncyanus*, *B. fluorescens liquefaciens*, *Micrococcus prodigiosus*, *M. cinnabareus*, and *Sarcina aurantiaca*. Certain forms such as *B. faecalis alcaligenes* vary in sign according to age and source. In general, the sign varies with the species, and certain families have a characteristic sign.—*Oran Raber*.

6245. CLUZET, ROCHAIX, ET TH. KOFMAN. Effets bactéricides de l'action combinée du galvanotropisme et des rayons X. [Bactericidal effects of the combined action of an electric current and X-rays.] Compt. Rend. Soc. Biol. 88: 780-781. 1923.—The bactericidal effect of X-rays is much increased if at the same time the bacteria are submitted to an electric current.—*Oran Raber*.

6246. GOVAERTS, PAUL. Accolement des microbes aux plaquettes sanguines et charges électriques. [The adhesion of microbes to blood corpuscles and electric charges.] Compt. Rend. Soc. Biol. 88: 993-996. 1 fig. 1923.—*Bacillus coli* adheres to blood corpuscles of the rabbit but not as the result of an attraction between 2 particles of opposite electrical charge. They adhere although of the same sign; this adhesion must be due to some other cause than difference in electrical sign.—*Oran Raber*.

6247. JOHNSON, I. S. C., AND R. G. GREEN. Conductivity of yeast cells. Jour. Infect. Diseases 34: 186-191. 2 fig. 1924.—Suspensions of live cells of *Saccharomyces cerevisiae* lower the resistance of the suspending solution. There was a greater decrease in the resistance of solutions suspending dead cells.—*R. L. Starkey*.

6248. MACDOUGALL, F. H., AND R. G. GREEN. Theory of electrical conduction of suspensions. Jour. Infect. Diseases 34: 192-202. 1924.—The application of mathematical expressions to experimental data lead to the conclusion that the resistance of dead cells of *B. coli* is greater than that of live cells. Conversely, the resistance of live cells of *Saccharomyces cerevisiae* is greater than that of dead cells. On death, the cells of the bacterium and yeast decreased in volume.—*R. L. Starkey*.

#### PHYSIOLOGY OF DISEASE

6249. LEGAILLON, A. Sur la biologie de la Mouche de la Betterave (*Pegomyia hyoasciami* Panz.) et sur le rôle que cet insecte peut jouer dans le développement de la jaunisse de la plante. [Biological notes on *Pegomyia hyoasciami* and the possible rôle of this fly in the spread of bacterial yellowing of beets.] Rev. Path. Vég. et Entomol. Agric. 10: 337-338. 1923.—Yellowing such as is ascribed to bacterial infection by *Bacillus tabificans* was observed on most of the leaves on which *Pegomyia hyoasciami* larvae were feeding.—*J. Dufrenoy*.

6250. NICOLAS, GUSTAVE. Nouvelles observations sur les anomalies végétales résultant de la non-dissociation et de la concrescence des organes. [New observations on plant anomalies resulting from the non-dissociation and the fusion of organs.] Compt. Rend. Soc. Biol. 88: 324-325. 1923.—In 3 out of 4 cultures to which hexamethylenetetramine had been added as a source of nitrogen, the first tri-foliate leaf of *Sophora secundiflora* Lag. had 2 of the leaflets joined. This is interpreted as due to a lack of nitrogen and supports the author's view that fasciation is a result of underfeeding rather than overfeeding.—*Oran Raber*.

#### SOIL SCIENCE

A. G. McCALL, *Editor*

(See also in this issue Entries 5619, 5622, 5623, 5626, 5634, 5656, 5659, 5662, 5663, 5669, 5681, 5723, 5737, 5892, 5986, 6090)

6251. ANONYMOUS. Peat as fertilizer ingredient. Jour. Amer. Peat Soc. 16: 107-109. 1923.—Opinions, favorable and unfavorable, with reference to the fertilizing value of peat are quoted.—*G. B. Rigg*.

6252. ALEXEIEFF, A. Coproprotistologie, branche nouvelle de la protistologie. [Coproprotistology, a new branch of protistology.] Compt. Rend. Soc. Biol. 86: 882-884. 1923.—In connection with fertility problems and the conservation of nitrogenous resources, attention is called to the necessity for further study of the microorganisms of manure. A list of forms found in a sample of liquid manure from Finland includes *Pseudospirillum coprocola* n. sp., and a yeast.—*Oran Raber*.



6253. ALLISON, ROBERT V. A preliminary note on the effect of the nitrate radical upon the biological oxidation of inorganic sulfur. *Ann. Rept. New Jersey Agric. Exp. Sta.* 43: 366-369. 1921-22 [1924].—The writer presents results to show that the presence of sodium nitrate in any considerable quantity retarded and sometimes completely inhibited sulphur oxidation.—*Wm. H. Martin.*

6254. ALLISON, R. V. Available studies upon high potash nitrate. *Jour. Amer. Soc. Agron.* 16: 26-30. 1924.—The availability of N and K of high potash nitrate was tested under greenhouse and field conditions. Pot culture shows that the amount of N and K in this compound is equivalent to that derived from  $\text{NaNO}_3$  and  $\text{K}_2\text{SO}_4$ . In field tests it was assumed that the N of the high potash nitrate was as effective as that in  $\text{NaNO}_3$ .—*F. M. Schertz.*

6255. ALLISON, R. V. The modulus of rupture of a soil as an index of its physical structure. *Jour. Amer. Soc. Agron.* 15: 409-415. 1923.—A method for the measurement of the tensile qualities of the soil mass has been developed. The apparatus used and the method of preparing soil samples is fully described. The modulus of rupture is compared for limed and unlimed soils.—*F. M. Schertz.*

6256. ANDERSON, A. C., E. MALCOLM JONES, AND THOMAS JABINE. Soil survey of Choc-taw County, Mississippi. *Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric.* 1920: 249-284. *Fig. 8, map (col.).* 1923.

6257. BALDWIN, I. L. Modifications of the soil flora induced by the application of crude petroleum. *Soil Sci.* 14: 465-475. 1 *fig.* 1922.—Applications of crude petroleum to soil inhibits most types of bacteria but greatly stimulates a few. Mold growth is not affected. Ammonia production in the soil is lowered slightly and nitrate formation is at first completely inhibited by the application of crude petroleum.—*W. J. Robbins.*

6258. BATCHELOR, L. D., AND H. S. REED. The seasonal variation of the soil moisture in a walnut grove in relation to the hygroscopic coefficient. *California Agric. Exp. Sta. Tech. Paper* 10. 31 p., 2 *fig.* 1923.—The walnut grove in which these observations were made is located in a semi-arid district, receiving a mean rainfall of about 13 inches most of which falls during the period when the trees are dormant. Irrigation was not practised until the trees were about 12 years old, at which time a majority of the trees were badly killed back by winter injury or dieback. During the period 1918-1921, different plots in the grove were given irrigations varying in amount and in time of application. Results showed that the stored soil moisture from winter rains or irrigations does not persist beyond the middle of the growing season, and that ordinary summer irrigations (4.6 acre inches per acre) are not sufficient.—*Margaret Buwens.*

6259. BEETS, A. N. J. Bemestingsproeven 1918-1919. [Manuring experiments 1918-1919.] *Mededeel. Proefsta. Vorstenland. Tabak* 46. 1-66. 1923.—The report gives results of a large number of experiments made in the test gardens with different kinds of manures and fertilizers.—*L. S. and W. H. Weston.*

6260. BEETS, A. N. J. Grondbewerkingsproeven 1915-1918. [Soil cultivation experiments, 1915-1918.] *Mededeel. Proefsta. Vorstenland. Tabak* 45. 1-77. 1922.—The article is a discussion of a number of native methods of soil cultivation in Java as tried out on various estates. (1) "Patjollen" is a method of hand hoeing with a native tool, to a depth of 9 inches. (2) In the "gebroessan" method, the field is divided into strips  $30 \times 3$  feet with drainage ditches between. The top soil of each strip is hoed to a depth of 5 or 6 inches, and thrown onto the adjoining strip. The sub-soil is then hoed to 9 inches, and the top soil returned. (3) "Kuilen" is approximately the same procedure, except that the top and sub-soil are allowed to stand exposed until thoroughly dried out before the top soil is returned. With the "kuilen" method, long exposure was found beneficial in wet years, this method of treatment being favored for heavy, wet soils such as those which have been standing under water during rice cultivation. Comparisons are made between fields on which the "kuilen" method was used, and fields on which cultivation by "patjollen" and "gebroessan" followed 2 plowings. On lands long cultivated "kuilen" gave the best results; on new lands it turned up too much of the unweathered subsoil. Good results could be obtained on lands submerged by river flooding and thereby covered with a deposit of volcanic sand, when the original surface soil was dug out and thrown on top of the volcanic deposits.—*L. S. and W. H. Weston.*

6261. BEETS, A. N. J. **Grondbewerkingsproeven 1919-1921.** [Soil cultivation experiments, 1919-1921.] Mededeel. Proefsta. Vorstenland. Tabak 48. 1-49. 1923.—Experiments as to the length of time which should elapse between cultivation and planting show in a general way that good results in yield per acre, and in size and quality of the leaves come from early cultivation. Various native methods of cultivation are considered. The benefit from digging out the original surface soil, and replacing it on the top of fields which have been covered with volcanic sand deposited by floods is discussed. Experiments in plowing with a small tractor and 2-furrow disk plow to a depth of 10 inches show approximately the same yield figures as the native "kuilen" cultivation to the same depth.—*L. S. and W. H. Weston.*

6262. BLACKSHAW, G. N. **Soil treatment for maize production. Reports upon experiments extending for 4 years.** Rhodesia Agric. Jour. 20: 524-542. 1923.—The report deals with experiments carried on for 4 seasons, to compare not only the relative values of fertilizers, of green manure alone, and of green manure in conjunction with fertilizers for maize production, and also to obtain data as to which of these 3 lines is the most permanently effective in preserving or improving the fertility of the soil. It was found that for the maintenance of the fertility of red maize soil under constant cultivation it is essential to dress the land periodically with farm manure, or as a substitute to plow under a suitable green manuring crop. It was also found that where kraal or stable manure is not available the green manuring treatment may be applied every 4th year.—*L. J. Goldblatt.*

6263. BLAIR, A. W., AND H. C. McLEAN. **The chemical composition of the soils of the Camden area in New Jersey.** New Jersey Agric. Exp. Sta. Bull. 346. 40 p., 1 fig. 1921.—Included in this study are 24 soil types, representing 10 soil series.—*Wm. H. Martin.*

6264. BOUYOUKOS, GEORGE JOHN. **Movement of soil moisture from small capillaries to the large capillaries of the soil upon freezing.** Jour. Agric. Res. 24: 427-432. 1 pl. 1923.—The freezing point lowering of soils at low moisture content diminished with repeated freezing and thawing. Stirring the soil after repeated freezing and thawing restored the original freezing-point depression. Allowing the soil to stand had somewhat the same effect. From these studies upon the temperature and freezing point lowering of soils, evidence has been obtained which indicates that when a soil short of saturation is frozen the force of crystallization tends to draw the moisture from the small capillaries and from around the particles as thick films, into the larger capillaries. However, when the soil is wet or saturated, under proper conditions the moisture freezes at the surface of the soil and forms capillary ice columns or thin needle-like crystals. The force of crystallization draws the water from below, which freezes at the lower end of the column and pushes the entire column upward. The relative distribution of the capillary water between the finer and the larger capillaries may have a very appreciable effect upon such factors as freezing point depression, vapor-pressure lowering, osmotic pressure, and rate of evaporation. Any treatment of the soil which will alter the relative distribution of the soil moisture as between the finer and larger capillaries would seem to affect these factors.—*Author.*

6265. BOUYOUKOS, G. J. **Relation between heat of wetting, moisture equivalent and unfree water.** Soil Sci. 14: 431-434. 1922.—There is a close and consistent relationship between the heat of wetting and the unfree water, but none between the heat of wetting and the moisture equivalent or between unfree water and moisture equivalent.—*W. J. Robbins.*

6266. BRADFIELD, RICHARD. **The chemical nature of a colloidal clay.** Missouri Agric. Exp. Sta. Res. Bull. 60. 5-60. 7 fig. 1923.—The fresh subsoil of Putnam silt loam, the predominating prairie soil of northeastern Missouri, was suspended in 5 parts of water by churning, the coarser material settled by gravity and the finest colloidal material separated by means of a centrifugal force of about 30,000 times gravity. This fraction was unusually high in  $\text{Al}_2\text{O}_3$  and  $\text{Fe}_2\text{O}_3$ , almost all of which was soluble in hot  $\text{HCl}$ . This indicated that the colloidal fraction might be made up largely of the completely broken down end products of weathering—colloidal  $\text{Al}_2\text{O}_3$ ,  $\text{Fe}_2\text{O}_3$  and  $\text{SiO}_2$ . A synthetic mixture of these colloids having a chemical composition similar to the natural colloid was prepared and their physico-chemical properties compared. Cataphoresis studies showed that the natural colloid was negative and that the synthetic mixture was positive. The migration velocity of the natural colloid was decreased by traces of acids and increased by traces of alkali, larger amounts of alkali causing flocculation. In no case was the direction of migration reversed. The synthetic colloid had



a much stronger buffer action than the natural colloid, due apparently to its high content of free  $\text{Al}_2\text{O}_3$ . The natural colloid was flocculated most readily by polyvalent cations in an acid medium. The synthetic mixture was more sensitive to polyvalent anions and to alkalis. Analyses of the fractions of each colloid soluble in dilute acid, and in dilute alkali, showed marked differences throughout. All data obtained indicate that the natural colloid is a complex aluminosilicate, rather than a mixture of the separate colloidal oxides.—*Author*.

6267. BROWN, P. E., AND R. N. GOWDA. **The effect of certain fertilizers on nitrification.** Jour. Amer. Soc. Agron. 16: 137-146. 1924.—Greenhouse experiments were conducted to show the effects of manure, clover hay, phosphate and nitrogenous fertilizers on nitrification in Carrington loam soil. Manure up to 36 tons per acre increased nitrification, while rock phosphates increased both the nitrate content and the nitrifying power of the soil. Acid phosphate stimulated the nitrifying power of the soil and gave a greater nitrate content.  $\text{NaNO}_3$  increased the nitrate content of the soil and also its nitrifying power. Clover hay had little effect upon the nitrate content of the soil but increased its nitrifying power. A 2-8-2 complete fertilizer increased the nitrate content of the soil and stimulated slightly the nitrifying power.—*F. M. Schertz*.

6268. BURKE, R. T. AVON. **Soil survey of Carroll County, Maryland.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1919: 5-36. 1 fig., map (col.). 1922.

6269. BURKE, R. T. AVON, AND A. T. SWEET. **Soil survey of Houston County, Alabama.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1920: 315-343. Fig. 10, map (col.). 1923.

6270. BUSHNELL, T. M., H. W. HAWKER, AND D. B. PRATAPAS. **Soil survey of Erath County, Texas.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1920: 371-406. Fig. 12, map (col.). 1923.

6271. CARTER, WILLIAM T., H. V. GEIB, M. W. BECK, A. C. ANDERSON, T. M. BUSHNELL, J. F. STROUD, W. B. FRANCIS, AND NEAL GEARREALD. **Reconnaissance soil survey of Northwest, Texas.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1919: 1-74. 14 pl., 1 fig., map (col.). 1922.

6272. COMBER, N. M. **A modified test for sour soils.** Jour. Agric. Sci. 12: 370-371. 1922.—An aqueous solution of potassium salicylate is offered as a substitute for an alcoholic solution of the potassium thiocyanate previously suggested by the author. It is noted that a red color develops when an aqueous solution of the former is used on sour soils, and a yellow or brownish yellow color in other soils. A 5% solution of the salicylate may be used, but more concentrated solutions react more rapidly.—*R. P. Marsh*.

6273. CUMMINS, ARTHUR B., AND WALTER P. KELLEY. **The formation of sodium carbonate in soils.** California Agric. Exp. Sta. Tech. Paper 3. 35 p. 1923.—The authors discuss the formation of  $\text{Na}_2\text{CO}_3$  in soils through a more or less complete saturation of the soil by neutral Na salts and the subsequent hydrolysis of the  $\text{Na}_2\text{SiO}_3$  compounds thus formed. When a soil is brought to equilibrium with a Na salt, the combined Ca, Mg and K passing into solution are chemically equivalent to the Na fixed, and the total of these ions is an exponential function of the concentration of Na salt remaining in solution. The solution becomes enriched with Ca, while the solid particles become relatively richer in Na. These new  $\text{Na}_2\text{SiO}_3$  complexes are less stable and more easily hydrolyzable than the corresponding Ca complexes. This tendency of the  $\text{Na}_2\text{SiO}_3$  compounds to hydrolyze leads to the formation of alkalinity. NaOH is formed and then readily converted into  $\text{Na}_2\text{CO}_3$  by the  $\text{CO}_2$  of the soil solution. Alkalinity was also developed by percolating water through columns of granites and several pure mineral silicates which had been previously treated with NaCl.—*Margaret Buwens*.

6274. CUTLER, J. VERNELL. **Notes on soil alkali.** South African Fruit Grower 10: 404-405. 1923.—Alkali here refers to soils, prevalent in arid areas, in which the presence of soluble mineral salts exerts an injurious and deleterious effect on plant life, though the soil itself may give a neutral reaction. The author discusses the composition of these soils and the problem of their utilization.—*L. J. Goldblatt*.

6275. CUTLER, J. VERNELL. **Notes on soil alkali.** South African Fruit Grower 11: 16-19. 1924.—Alkali lands are best utilized by the growing of alkali resistant crops, though these lands are best reclaimed by the underdrainage of the soil.—*L. J. Goldblatt*.

6276. CUTLER, J. VERNELL. On lime and liming materials. South African Fruit Grower 10: 336-337, 339. 1923.—The tolerance of plants to liming, the means and time of applying lime, the composition and form of various liming materials, and the relative value of different degrees of fineness in liming materials are discussed.—*L. J. Goldblatt*.

6277. CUTLER, J. VERNELL. On lime and liming materials. South African Fruit Grower 10: 373. 1923.—The method of determining the cost of liming materials is discussed. One of the reasons why liming does not pay so well in South Africa as in Europe is that 90% of the soils in the former country are deficient in phosphates, and even in those cases where an increased micro-organism stimulus would be brought about, the practice of liming cannot be considered economical unless the phosphate deficiency is remedied.—*L. J. Goldblatt*.

6278. DACHNOWSKI, A. P. Contributions of peat investigations to the cranberry grower Jour. Amer. Peat Soc. 16: 96-106. 1923.—The identification of layers of peat by means of the plant remains that they contain is discussed, as is also the bearing of stratigraphic peat investigations on the growing of cranberries.—*G. B. Rigg*.

6279. DUNN, J. E., MARK BALDWIN, AND CHARLES N. MOONEY. Soil survey of Orange County Florida. Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1919: 1-24. 1 fig., map (col.). 1922.

6280. EMERSON, PAUL. A suggested laboratory and field test for soil acidity. Jour. Amer. Soc. Agron. 15: 495-499. 1923.—Full details are given for a test based upon Comber's potassium thiocyanate method. The author suggests formulas for color standards corresponding to the approximate lime requirement of the soil.—*F. M. Schertz*.

6281. FUCHS, A., UND ZIEGENSPECK, H. Aus der Monographie des Orchis Traunsteineri Sauter. II. Teil: Mykorrhiza und Boden. [From the monograph on Orchis Traunsteineri Sauter. II. Mycorrhiza and soils.] Bot. Archiv 3: 237-261. 1923.—The authors first present the results of chemical analyses of various soils where mycorrhizal plants are found. In these soils denitrifying bacteria are absent, but ammonifiers are abundant. Fixation of atmospheric nitrogen goes on continuously, but the transformation of N into nitrates is greatly reduced if not completely hindered. Since  $\text{NH}_3$  and  $\text{NH}_4$  salts are the source of N for green plants of this region, a normal meadow flora is not found on these acid moors. The moor flora can be divided into 4 groups on the basis of the manner in which the plants obtain nitrogen, as follows: (1) Ammonia plants; plants which are able to use  $\text{NH}_4$  salts directly, e.g., blood root and Alchemilla. (2) Salt parasites; plants which use the root system of other plants, e.g., Pedicularis spp. The ammonia plants are primarily the hosts of these. (3) Carnivorous plants; it is not a coincidence that nearly all these species thrive on virgin humus. Their root systems are poorly developed. Their nitrogen is obtained through catching and digesting of insects, e.g., Drosera, Dinaea, Pinguicula, Sarracenia, Utricularia, etc. (4) Forms which obtain N from the air; these include such N-fixing plants as the alder, and legumes with their root nodules. (5) Mycotrophic plants; this group includes such forms as the orchids. These plants are constantly associated with mycorrhizal fungi. (6) Epiphytic "mycotropes"; these plants obtain nitrogen from bird droppings. They include epiphytic orchids and aroids. The tree lichens of temperate regions belong to this class. (7) Plants of high altitude soils; the rocky nature and constant washing of the soil of mountain tops leaves them poor in N. Lichen floras and "mycotropes" constitute a large part of the plants of these regions.—*William Seifriz*.

6282. HARRIS, F. S., M. D. THOMAS, AND D. W. PITTMAN. Toxicity and antagonism of various alkali salts in the soil. Jour. Agric. Res. 24: 317-338. 13 fig. 1923.—During 2 years at the Utah Experiment Station, experiments were performed to learn whether salts, acids or manure, when added to soils artificially impregnated with  $\text{Na}_2\text{CO}_3$ , NaCl or  $\text{NaNO}_3$  will ameliorate the injury caused by such "alkali" to wheat seedlings. In the main experiment,  $\text{Na}_2\text{CO}_3$  varying from slightly to extremely toxic quantities, was placed in tumblers arranged in triangular form, and for each concentration of  $\text{Na}_2\text{CO}_3$ , varying quantities of the following substances, singly and in systematic combinations within the groups, were added: (1)  $\text{H}_2\text{SO}_4$ ,  $\text{K}_2\text{SO}_4$ ,  $\text{Na}_2\text{SO}_4$ ; (2) HCl, KCl, NaCl; (3)  $\text{HNO}_3$ ,  $\text{KNO}_3$ ,  $\text{NaNO}_3$ ; (4) NaCl,  $\text{Na}_2\text{SO}_4$ ,  $\text{NaNO}_3$ ; (5)  $\text{Na}_3\text{AsO}_3$ ,  $\text{Na}_2\text{HPO}_4$ ,  $\text{Na}_2\text{B}_4\text{O}_7$ ; and (6)  $\text{CaSO}_4$ , S, barnyard manure. In a sandy soil  $\text{CaSO}_4$  and  $\text{H}_2\text{SO}_4$  corrected injury to the plants due to  $\text{Na}_2\text{CO}_3$ , NaCl or  $\text{NaNO}_3$ , but in loam or clay no positive effect was noted. None of the above named substances or combinations corrected



the harmful effect of  $\text{Na}_2\text{CO}_3$  in loam except when used in quantities either non-toxic or stimulating to the plants when used alone. Adding toxic quantities apparently added their toxicity to that of the  $\text{Na}_2\text{CO}_3$ .  $\text{CaSO}_4$  alone and in combinations with S and manure were the best correctives of injurious quantities of  $\text{Na}_2\text{CO}_3$ . Borax and  $\text{Na}_3\text{AsO}_3$  had a peculiar physiological effect on wheat plants.—*F. S. Harris.*

6283. HESSELINK, E. **Het sterven der planten door overmatige verhitting van de bodemoppervlakte.** [Dying of plants through excessive heating of the soil surface.] *Culture* 35: 393-395. 1923.—Radiation takes place especially in the form of dark heat rays and is dependent on temperature differences, extent of the soil surface and the water content. Radiation takes place especially during clear nights. The giving off of heat from the deeper layers of the soil is modified by the moisture content and by the firmness of the soil, the dry, loose soil losing but little. Where there is sufficient moisture for evaporation there is no danger of overheating. Dry air and wind stimulate evaporation and therefore help to prevent overheating.—*J. C. Th. Uphof.*

6284. HIBBARD, P. L. **Experiments on the reclamation of alkali soils by leaching with water and gypsum.** *California Agric. Exp. Sta. Tech. Paper* 9. 14 p. 1923.—The changes taking place in alkaline soils when leached with water containing gypsum in solution were observed by means of laboratory experiments, 5 types of soil being used. The rate of leaching varied, percolation being inversely proportional to their content of  $\text{Na}_2\text{CO}_3$ . The author points out that rates of percolation may be more rapid in the field than in the constricted columns used in the experiment. Attempts to grow plants in the leached soil failed, since leaching removed desirable plant food as well as the injurious salts. A table is given showing the percentages of the various ions removed. Carbonate and bicarbonate were least thoroughly removed; chloride, most completely. There was an exchange of Ca for Na between the relatively insoluble minerals; this brought about a distinct improvement in the soils.—*Margaret Buwens.*

6285. JENNINGS, A. C. **Soils washing, or the surface erosion of cultivated lands.** *Rhodesia Agric. Jour.* 20: 647-653. 5 fig. 1923.—The writer maintains that the problem of erosion of cultivated lands is worse in Rhodesia than in many parts of the Union of South Africa owing to the more tropical climate of the former. The various means of checking and correcting the "wash" of cultivated lands are discussed.—*L. J. Goldblatt.*

6286. JENNINGS, D. S., M. D. THOMAS, AND W. GARDNER. **A new method of mechanical analysis of soils.** *Soil Sci.* 14: 485-499. 6 fig. 1922.—The method consists essentially in shaking a dilute, deflocculated soil suspension in a cylindrical vessel, placing the latter in an upright position and observing the concentration at measured distances below the surface, as it changes with the time. Only inexpensive apparatus is needed.—*W. J. Robbins.*

6287. JOFFE, JACOB S. **Acid phosphate by the biological process.** *Ann. Rept. New Jersey Agric. Exp. Sta.* 43: 361-365. 1921/22 [1924].—Reporting on the possibilities of utilizing microbiological sulphur oxidation in making phosphates available from the insoluble rock phosphate, the writer presents results to show that with each increase in soil moisture above 50% of its water holding capacity there was a decrease in the amount of soluble phosphorus in a compost of floats, sulphur and soil. The conversion of insoluble phosphates was hastened by the addition of soil, green sand, or other inert material. These materials appear to serve as a temporary storage place for the acid produced, thus removing it as rapidly as it is formed. Small additions of greenhouse soil stimulate the sulphur oxidizing organisms.—*Wm. H. Martin.*

6288. JONES, E. MALCOLM, H. G. LEWIS, W. I. WATKINS, A. C. ANDERSON, AND G. W. MUSGRAVE. **Soil survey of Lamar County, Mississippi.** *Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric.* 1919: 5-40. 1 fig., map (col.). 1922.

6289. JONES, LINUS H. **Effect of repeated applications of ammonium sulphate on the reaction and crop-producing power of a soil.** *Ann. Rept. New Jersey Agric. Exp. Sta.* 43: 384-387. 1 pl. 1921/22 [1924].—Repeated applications of large amounts of  $(\text{NH}_4)_2\text{SO}_4$  resulted in decreasing the hydrogen-ion exponent values of the soil to such an extent as to prevent the development of soybeans. The results indicate that this toxic influence of the soil may be removed by adding lime in sufficient quantities to bring the pH value to approximately 7.0.—*Wm. H. Martin.*

6290. JURNEY, R. C., S. O. PERKINS, W. A. DAVIS, AND W. D. LEE. Soil survey of Guilford County, North Carolina. Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1920: 167-198. 1 fig., map (col.). 1923.

6291. KELLEY, WALTER P., AND EDWARD E. THOMAS. The removal of sodium carbonate from soils. California Agric. Exp. Sta. Tech. Paper 1. 24 p. 1923.—This paper gives the results of a laboratory study made to determine the effects of various neutralizing substances on black alkali soils. Five soils were used, varying considerably in total salt content and in amount of soluble carbonate. Each soil was treated with the following substances: elemental S,  $H_2SO_4$ ,  $CaSO_4$ ,  $FeSO_4$ , and soluble Al in the form of  $KAl(SO_4)_2$ . The authors conclude that  $CaSO_4$ , although less effective chemically as a means of removing soluble carbonate, may in the long run be preferable to elemental S or  $H_2SO_4$  for non-calcareous black-alkali soils. If an amount of elemental S or  $H_2SO_4$  be applied, sufficient to neutralize the alkalinity in both surface soil and subsoil, an acid condition of the surface soil will result. The  $CaSO_4$  is able to restore Ca to the soil silicates which probably take an important part in normal soil processes. If the soils contain an excess of  $CaCO_3$ , however, or if the subsoil is not very alkaline, the elemental S or  $H_2SO_4$  may prove as effective as the  $CaSO_4$ . The  $FeSO_4$  and the alum successfully neutralized alkalinity, but it is considered that further studies must be made to determine the practical value of the substances. The application of  $CO_2$  to soils successfully lowered the alkalinity, suggesting that the beneficial effect of manure may be due to the  $CO_2$  that is formed in its decomposition.—Margaret Buvens.

6292. KOCHER, A. E., AND E. F. TORGERSON. Soil survey of Josephine County, Oregon. Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1919: 349-407. Pl. 11-13, fig. 8, map (col.). 1923.

6293. LAGATU, HENRI. Sur l'expression mathématique de l'influence des éléments fertilisants contenus ou apportés dans le sol. [The mathematical expression of the influence of fertilizer elements contained in or applied to the soil.] Ann. Ecole Nation. Agric. Montpellier 17: 270-279. [1919?].—The author attempts, through a series of equations, to derive a mathematical expression combining the various factors most important in plant nutrition. From his mathematical treatment the author concludes that a soil may be insufficiently nutrient with respect to a given element, for 2 reasons: (1) The total content is inadequate to maintain a supply of this element, soluble in water, sufficient to meet the normal needs of the plant; these are infertile soils and are rare. (2) The soil cannot yield soluble material fast enough to meet the particular active needs of the plant at certain periods; these are generally fertile soils which are unable to meet plant requirements at critical periods. He then considers the effect of the introduction of fertilizers more soluble than the compounds of the soil containing the element in question.—A. B. Cummins.

6294. LATIMER, W. J., R. T. BURKE, AND O. C. BRUCE. Soil survey of Frederick County, Maryland. Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1919: 1-79. 1 fig., map (col.). 1922.

6295. LEWIS, H. G., AND W. A. DENECKE, JR. Soil survey of Kootenai County, Idaho. Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1919: 1-43. 4 pl., 2 fig.<sup>1</sup>, map (col.). 1923

6296. LONG, DAVID D., E. T. MAXON, N. M. KIRK, H. G. LEWIS, F. A. HAYES, E. C. HALL, H. V. GEIB, AND G. A. CRABB. Soil survey of Oconee, Morgan, Greene, and Putnam Counties, Georgia. Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1919: 5-58. 1 fig., 2 maps. (col.). 1922.

6297. LYON, T. L., AND H. C. BUCKMAN. Availability of the phosphorus of floats as influenced by incorporation of farm manure in the soils. Jour. Amer. Soc. Agron. 16: 96-104. 1924.—The application of floats to manured plots increased crop production. Smaller increases were obtained by using floats in connection with a basic treatment of minerals instead of manure. Under the conditions of the experiment, manure contributed to the availability of the floats.—F. M. Schertz.

6298. LYON, T. L., AND H. C. BUCKMAN. Edaphology. Jour. Amer. Soc. Agron. 16: 24-25. 1924.—Edaphology is defined as the science of the nature and properties of soils in their relation to plant growth.—F. M. Schertz.



6299. LYON, T. L., J. A. BIZZELL, AND B. D. WILSON. **Depressive influence of certain higher plants on the accumulation of nitrates in soil.** Jour. Amer. Soc. Agron. 15: 457-467. 1923.—Pot experiments indicate that maize did not depress nitrate accumulation during early growth but did later. Wheat showed a depressing effect throughout its entire period of growth.—*F. M. Schertz.*
6300. MARCHAND, B. DE C. **Representative Transvaal soils V. The Springbok Flats black turf.** Jour. Dept. Agric. Union South Africa 7: 438-442. 1923.—This soil type occurs over a comparatively limited area in the Pretoria and Waterberg districts. Chemically the soil is characterized by a high percentage of lime. The amount of potash contained is reasonably high, though not abnormally so for the Transvaal. The amounts of nitrogen and organic matter are not high and the soil is not, as is commonly supposed, rich in humus, the appellation "turf," therefore, being a misnomer. The phosphorus content of the soil is limited.—Maize is the principal crop, and an excellent yield is obtained for 20 to 30 years without manuring. Amongst other crops, cotton has been successfully grown.—*L. J. Goldblatt.*
6301. MARCHAND, B. DE C. **Representative Transvaal Soils VI. Sandy soils and sandy loams on the older granite.** Jour. Dept. Agric. Union South Africa 8: 16-21. 1924.—These soils are not very productive and require building up as regards both fertility and texture. In the northeastern and eastern areas it is probable that peanuts and cotton will become the staple crops, while considerable areas are being planted with citrus. The following crop rotation is suggested: Peanuts, lime; cotton, phosphate manure; maize, no soil treatment.—Potatoes, pears, barley and onions have been grown with fair success on soils of this type.—*L. J. Goldblatt.*
6302. MEYER, A. H. **Soil survey of Rockdale County, Georgia.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1920: 537-552. *Fig. 16-17, map (col.).* 1923.
6303. MURPHY, HENRY F. **Nitrification experiments on soils of the red prairies.** Jour. Amer. Soc. Agron. 16: 130-136. 1924.—Lime increased nitrification in the two soils studied, the heavier application giving the greatest nitrification. CaO was somewhat more effective than ground  $\text{CaCO}_3$ .—*F. M. Schertz.*
6304. MURPHY, HENRY F. **The effect of lime and manure on Vernon and Kirland soil as measured by plant characteristics.** Jour. Amer. Soc. Agron. 15: 442-444. 1923.
6305. PATRICK, AUSTIN L., E. B. DEETER, C. C. ENGLE, AND L. L. LEE. **Soil survey of the Bernardsville area, New Jersey.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1919: 409-466. *Pl. 14-16, fig. 9, map (col.).* 1923.
6306. PATTEN, G. R. **A summary of some experiments carried out by the Bureau of Sugar Experiment Stations. VII.** Queensland Agric. Jour. 19: 425-433, 474-492. *Pl. 109;* 20: 31-45. *Pl. 1.* 1923.—Chemical analyses of the soils of the sugar districts of North Queensland, Mackay, Proserpine, and Bundaberg are given.—*W. D. Francis.*
6307. PATTEN, G. R. **A summary of some experiments carried out by the Bureau of Sugar Experiment Stations. VIII.** Queensland Agric. Jour. 20: 71-79. 1923.—Average analyses of Hatton (Mackay) and Alton Downs (Rockhampton) sugar growing soils, and other tabulated analytical data concerning the soils of the sugar growing districts of Queensland are given.—*W. D. Francis.*
6308. POWERS, W. L. **Sulfur in relation to soil fertility.** Oregon Agric. Exp. Sta. Bull. 199. 1-45. 17 fig. 1923.—In 1912 the Oregon Experiment Station found that increases in alfalfa yields could be secured by the use of elemental S. Subsequent analyses and experiments indicate that S is a limiting element.—Legumes, particularly alfalfa and red and alsike clovers, have responded strongly to S applications. Wheat and potatoes gave moderate increases, while field peas, beans, corn, kale, rape and sunflowers gave but little increases.—The Station also showed that S increases the protein content of crops.—The red hill regions of western Oregon contain 150 to 400 pounds of S in the plowed surface of an acre, but the addition of S gives 25-50% increase in the yield of clover and grain. Lysimeter studies indicate that 40-45 pounds of S is lost in the annual percolate, while precipitation adds only 3-6 pounds an acre per year.—S seems to be related to N supply. At the beginning of the growing season, after the cold, wet weather has depleted the nitrate and sulfate supply in western Oregon, S aids in establishing a stand of new clover.—Sulphofication studies show that most of the Oregon soil types contain organisms capable of oxidizing S more rapidly than is necessary for plant needs.—It seems that the basaltic region of the Northwest is the greatest field for the

profitable use of S.—Use of elemental S has tended to aggravate soil acidity in humid sections so that its continued use makes occasional liming necessary.—The duration of the increase in yields from 100-pound-per-acre application is 3 to 5 years.—*C. E. Owens.*

6309. ROCKIE, W. A., C. E. DEARDORFF, L. H. BRITTON, AND L. S. PAINE. *Soil survey of Sioux County, Nebraska.* Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1919: 1-40. 1 fig., maps (col.). 1922.

6310. RUBNER. [Rev. of: BURGER, HANS. *Physikalische Eigenschaften der Wald- und Freilandböden.* [Physical properties of soils under forest and in the open.] Mitteil. Schweiz. Centralanst. Forst. Versuchsw. 13: 3-221. 14 fig. 1922.] Forstwiss. Centralbl. 45: 398-400. 1923.—One of the most significant results of this study from a forester's standpoint is the demonstration of reduction in air-capacity of the soil following clear-cutting. Air-capacity ("Luftkapazität") is the volume of those spaces remaining filled with air after the soil has been thoroughly saturated with water.—*W. N. Sparhawk.*

6311. RUZEK, C. V., AND E. J. CARPENTER. *Soil survey of Multnomah County, Oregon.* Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1919: 47-96. Pl. 5-6, fig. 3, map (col.). 1922.

6312. SMITH, HOWARD C., AND R. C. ROSE. *Soil survey of Charles County, Maryland.* Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1918: 1-45. 1 fig., map (col.). 1922.

6313. SMITH, J. WALDO. *The Beccari process of garbage disposal.* Amer. Jour. Public Health 14: 119-121. 2 fig. 1924.—The Beccari process of garbage disposal, developed by Giuseppe Beccari, of Florence, Italy, is now in use in Florence and in a number of other places in that country. By this process the garbage, after being hand-picked for materials having a commercial value, is put into closed cells of about 25 cu. yds. capacity, so constructed as to allow aeration. The temperature quickly rises to 140°F. or more and vast numbers of bacteria appear. The fermentation continued in the cells for about 35 days. Virulent microorganisms of typhoid, scarlet fever, trachoma, and even those as persistent as anthrax, are completely destroyed, as are also, the larvae of flies, fleas, and other parasites. The germinative power of all seeds is likewise checked. The gases produced in a cell are passed over  $\text{NH}_3$  absorbents and after about 35 days the material is removed to a storage shed and piled up, after which additional heat is developed. After 5 to 15 days it is screened and used as fertilizer. This material is then humus-like in appearance and free from any obnoxious characteristics.—*C. A. Ludwig.*

6314. STARKEY, E. B. AND NEIL E. GORDON. *Influence of hydrogen-ion concentration on the adsorption of plant food by soil colloids.* Soil. Sci. 14: 449-457. 1 fig. 1922.—Adsorption of the cation increased with increased pH value, while in some cases adsorption of the phosphate ion increased with decreased pH values. Adsorption of nitrate and sulphate ions was not consistently influenced by the reaction. Anions were adsorbed in the order—phosphate, sulphate and nitrate. Adsorption by ferric hydroxide gel was greater than by silicic acid gel.—*W. J. Robbins.*

6315. STRAHORN, A. T., H. STUCKI, AND D. S. JENNINGS. *Soil survey of the Delta Area, Utah.* Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1919: 5-37. Pl. A (col.). pl. 1-3, fig. 1, map (col.). 1922.

6316. SWANSON, C. O. *Soil reaction in relation to calcium adsorption.* Jour. Agric. Res. 26: 83-123. 7 fig. 1923.—The difficulties in the use of the H-electrode with soil are described. A special apparatus was devised, by means of which it is possible to have 6 determinations in progress at the same time. The soil suspension or extracts are subjected to a continuous shaking during measurements. In mineral soil the acid condition has resulted from an excessive removal of bases by weathering, the end result of which is an impoverishment in Ca and other strong bases and an enrichment in aluminosilicates of an acid nature. It is these silicates which are the harmful ingredients in an acid soil. On the basis of this hypothesis, measurements of the Ca adsorption of several acid soils were carried out by adding varying amounts of  $\text{Ca}(\text{OH})_2$  and determining the pH, and by various modifications of this method. The adsorptive power of a soil for Ca was found to be more related to the clay content than to the initial H-ion concentration. The amount of clay is inferentially a measure of the acid aluminosilicates. The presence of KCl reduced the amount of Ca



adsorption. The H-concentration was found to be greater in the suspensions than in the extracts. Leaching the soil did not decrease the H-ion concentration. This means that while the H-ions which come from the aluminosilicates are able to affect the H-electrode, they are not free in the sense that they go into the filtrate. Ignition did not destroy the acid condition nor the power of Ca adsorption. Fuller's earth had a higher H-ion concentration and a greater adsorptive power than soil. The harmful effect of the acid aluminosilicates in the soil is not due so much to high H-ion concentration as to lack of available Ca. Since in the presence of such silicates Ca is so strongly adsorbed that not enough is available for plant use, soils low in Ca had a H-ion concentration indicative of an acid condition. Soils high in Ca gave an alkaline reaction. The problem of soil acidity is more related to available Ca than to any other factor. If Ca in soil is abundant, enough is available and the acid condition will not exist.—*Author*.

6317. SWANSON, C. O., AND W. L. LATSHAW. Sulfur as an important fertility element. *Soil Sci.* 14: 421-430. 1922.—The S content of 96 Kansas soils, both cropped and uncropped, was determined. The S content is decreasing in the soils of eastern Kansas, the amount added in the rainfall being insufficient to replace even that lost by leaching. The loss of S is greater than that of pH and is proportional to the loss of N.—*W. J. Robbins*.

6318. TAYLOR, ARTHUR E. Soil survey of Flagler County, Florida. Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1918: 5-39. 1 fig., map (col.). 1922.

6319. TAYLOR, ARTHUR E., AND T. J. DUNNEWALD. Soil survey of Duval County, Florida. Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1921: 21-47. Fig. 2, map (col.). 1923.

6320. THARP, W. E., AND WILLIAM DEYOUNG. Soil survey of Smith County, Mississippi. Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1920: 445-491. Fig. 14, map (col.). 1923.

6321. Тулайков, Н. М. [Tulaikov, N. M.] Солонцы их улучшение и использование. [Alkali lands, their improvement and cultivation.] Народный комиссариат земледелия. Государственное издательство: Москва [People's Agricultural Commissariat, Government Printer; Moscow.] 2nd ed. 235 p. 1922.—This treatise gives a comprehensive review of our state of knowledge about improvement and utilization of alkali soils. The 1st edition appeared in 1910 as a report of 18 months' studies by the author in the United States. The present edition includes practically all that appeared on the subject between 1910 and 1918, with particular attention to Russian conditions. The author dwells extensively on both the practical and theoretical aspects of the question, but endeavors to avoid debatable phases.—What might be of particular interest to the American reader is the review of results obtained in Russia in the field of reclamation and improvement of alkali lands.—The book familiarizes the reader with practically all the alkali reclamation projects on the globe.—*J. Davidson*.

6322. VAN REENEN, R. J. A résumé of the drought problem in the Union of South Africa. *South African Jour. Sci.* 20: 178-192. 1923.—It is impossible to define the condition of drought to actual inches of annual rainfall. Drought, therefore, must be associated in the mind not so much with a small as with a subnormal rainfall. Remedial measures which may be introduced naturally divide themselves into three main classes: (1) Artificial rainfall, (2) proposal to provide huge sheets of water or forests with the hope of increasing the humidity of the atmosphere, and (3) more efficient use of the rainfall.—In spite of the more or less unchanged rainfall many parts of the Union appear to be drying up. A general deterioration in the vegetal cover over huge areas of the Union is in progress. The destruction and deterioration of the vegetal cover is primarily caused by incorrect methods of farming, overstocking, overgrazing, and kraaling of stock; by the jackal; by veld burning; by destruction of forests; and by wasteful native farming methods resulting from the communal system in vogue among the Bantu.—*E. P. Phillips*.

6323. VINSON, A. E., AND C. N. CATLIN. The auxotaxic curve as a means of classifying soils and studying their colloidal properties. *Jour. Agric. Res.* 26: 11-13. 4 fig. 1923.—The auxotaxic (swelling-rate) curve is the outgrowth of a study of the swelling coefficient of dry soils when wetted, as previously published in detail by the authors. (*Jour. Amer. Soc. Agron.* 14: 302-307. 1922.) Under standard conditions every dry soil expands at a char-



acteristic rate automatically recorded as an auxotaxic curve. The curve integrates the swelling due to texture, colloidal organic and inorganic matter, and soluble salts; it is also affected by temperature and the presence of electrolytes and colloids in the swelling medium. The curve may prove of value in classifying soils and studying problems involving soil colloids. A possible explanation of the lateral breaking of drain tiles laid in certain dry soils is given, based on the auxotaxic curve.—*A. E. Vinson.*

6324. WAXSMAN, SELMAN A. Influence of nitrogen fertilization upon the microbiological activities of the soil. *Ann. Rept. New Jersey Agric. Exp. Sta.* 43: 359-361. 1921-22 [1924].—The writer reports results in which he shows that (1) there seems to be some correlation between total number of microorganisms and crop yields, (2) the numbers of fungi are highest in acid soils, (3) there is no correlation whatsoever between  $\text{NH}_3$  formation in soils or in solution and in crop yields, and that (4) there is some correlation between nitrification and crop yields.—*Wm. H. Martin.*

6325. WATSON, E. B., E. C. ECKMANN, A. L. FLUHARTY, AND C. V. RUZEK. Soil survey of Washington County, Oregon. *Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric.* 1919: 5-49. 1 pl., 1 fig., map (col.). 1923.

6326. WATSON, W. Peat in soil amendment. *Jour. Amer. Peat Soc.* 16: 90-91. 1923.—The fertilizing properties of peat are negligible but as a mechanical adjunct to the soil it has great value.—*G. B. Rigg.*

6327. WHEETING, L. C., AND S. G. BERGQUIST. Soil survey of St. Joseph County, Michigan. *Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric.* 1921: 49-70. Pl. 1-4, fig. 3-4, map (col.). 1923.

6328. WILEY, R. C., AND NEIL E. GORDON. Adsorption of plant food by colloidal silica. *Soil Sci.* 14: 441-448. 1922.—Metals are negatively adsorbed by both the hydrogel and hydrosol. The nitrate and sulphate radicals of Ca, Mg and K are negatively adsorbed. The phosphate radical is positively adsorbed by the hydrogel and negatively by the hydrosol.—*W. J. Robbins.*

6329. WILSON, BENJAMIN D. The quantity of sulphur in rain water. *Jour. Amer. Soc. Agron.* 15: 453-456. 1923.—The literature reports the following amounts of sulphur supplied to each acre by rain water: Pullman, Washington, 5.57 pounds; Ames, Iowa, 14.89 pounds; Tennessee, 12.7-232.4 pounds; Ithaca, N. Y. (1918-19), 27.8 pounds, (1919-20) 24.6 pounds, (1920-21) 26 pounds, (1921-22) 33.4 pounds, (1922-23) 35.9 pounds.—*F. M. Schertz.*

## TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

E. D. PAYSON, *Assistant Editor*

(See also in this issue Entries 5720, 5751, 5902, 5908)

## MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

SAM F. TRELEASE, *Editor*

6330. BUTTRICK, P. L. An American visitor at Kew. *Amer. Forest.* 29: 467-470, 504. 3 fig., map. 1923.—Popular.—*C. H. Otis.*

6331. DUDGEON, W. The botanical opportunity in India. (Presidential address, Section of Botany, Ninth Indian Science Congress.) *Proc. Asiatic Soc. Bengal (N. S.)* 18\*: 95-115. 1923.

6332. HASKELL, SIDNEY B. Agricultural research in its service to American industry. *Jour. Amer. Soc. Agron.* 15: 473-481. 1923.—Presidential address.—*F. M. Schertz.*

6333. HENRIQUES, O. M. Technique de la numération des Bactéries. [The technique of counting bacteria.] *Compt. Rend. Soc. Biol.* 88: 819-820. 1923.—A method is described for counting the bacteria in vaccines. For getting an even suspension, a protective colloid is recommended.—*Oran Raber.*

6334. HIRAO, T. R. Maori plaited basketry and plaitwork. 1: Mats, baskets and burden-carriers. *Proc. Trans. New Zealand Inst.* 54: 705-742. Pl. 78-82, 41 fig. 1923.—The plants



used are *Phormium tenax*, *P. Cookianum*, *Freycinetia Banksii*, *Scirpus frondosus*, *S. lacustris*, *Cordyline australis*, *C. indivisia*, *Astelia Cunninghamii*, *A. Banksii*, *Rhopalostylis sapida*, *Hierochloe redolens*, *Carex lucida*, *C. comans*, and *Hoheria populnea*. The methods of preparation, and the native plant names are given.—*Wm. Randolph Taylor*.

6335. HOWARD, R. Uncle Sam's proving grounds. *Sci. Amer.* 129: 10-11. 5 fig. 1923.—A popular account is given of the various Federal experimental farms and some of the activities and problems under investigation.—*Chas. H. Otis*.

6336. JENDRASSIK, L. Niveauregulator für Wasserdestillation. [An apparatus to regulate the level of water during distillation.] *Biochem. Zeitschr.* 144: 285-286. 1 fig. 1924.

6337. JOHNSON, HARLAN W. A simple micropipette holder. *Jour. Bact.* 8: 573-575. 1923.

6338. VINCENT, MAURICE. Dispositif simple pour transport électrique. [A simple arrangement for electric conduction.] *Compt. Rend. Soc. Biol.* 88: 1035-1036. 1 fig. 1923.—A simple apparatus for supplying a current of feeble intensity and constant polarity is described.—*Oran Raber*.